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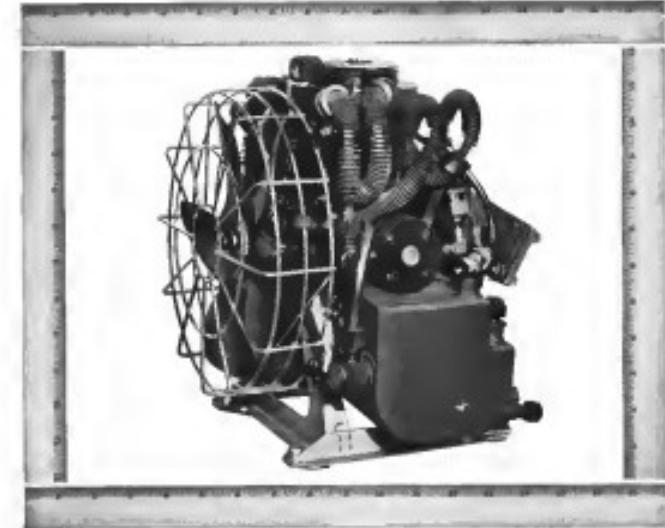
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Phillips 66

PRESENTS

MILESTONES IN AVIATION



How Lieut. Towers' Thrilling Adventure Inspired the Safety Belt

*GENERAL JOHN H. TOWERS, U. S. N. (RET.)

On June 20, 1923, Navy Lt. John H. Towers was flying over Chesapeake Bay in a Wright biplane, consciousness gone to sleep by taking a Curtiss potentiometer from his pocket and throwing it through from his seat. As the plane plunged toward the water, 1600 feet below, the quick-thinking Towers gripped a wing strut and rode the plane down.



The plane disengaged in the choppy water. Barely injured, Lt. Towers seized a section of the broken propeller, in which he hooked himself with a handkerchief and floated until he was rescued. Later, he suggested to Glenn Curtiss that all planes be equipped with easy safety belts—an idea destined to save many lives, and another milestone in aviation progress.



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Domestic

Pilot strike between Australia Air Lines and Air Lines Pilots Assn has been broken off, and ALPA was trying to determine last week whether the National Mediation Board would rule in favor of production or the proposed National Council of the Job Security Agreement. If the strike is not renewed, the union probably will set a new date for the strike, originally scheduled for July 13. Said NMAI member Everett Tidwell: "We are awaiting further developments."

Zodiac 1. Miss. Condor Aircraft Corp.'s new anti-submarine craft has completed its first flight. The 275 ft Navy boat is powered by two 300-hp Curtiss-Wright Cyclone 7 engines with Giddens Marine Twin-Props, specially developed for lighter hovercraft speeds.

Ladderdair Corp.'s Coopers Division is putting a USAF B-47 through modifications, including rear report leaves at Memphis under a new Air Force contract designed to keep planes up to the most modern configurations at all times. The modification program is expected to continue through January 1957.

New USAF weapons will be developed by Ford Motor Co under a classified contract totaling approximately \$3 million.

Republic Aviation Corp. has moved engineering personnel assigned to the F-105 fighter-bomber project from New York to a new office suspended in the center of a steel-and-glass plant at Farmingdale, N. Y. The transfer is designed to speed work on the project by keeping engineers closer to production personnel.

"Go now, pay later" credit plan for world air travel is being offered by American Airlines, allowing no down payment and up to two years to pay.

Lt. Gen. Robert R. Hanson has been appointed superintendent of the new Air Force Academy, will supersede the staff and director the school's opening next year at temporary quarters at Lowry Field in Denver.

Aircraft Engineering Foundation, made up of C-46 operators, has offered to buy 50 of the twin engine transports now leased by the Air Force.

Spartan Corporation, Costa Mesa, N. Y., has won a new USAF contract



Boeing 707 Beats Comet 3 Into the Air

A new chapter in trans-Atlantic jet transport routes was opened when the Boeing 707 Stratocruiser (Reg. G-AZAA) on first flight four days ahead of Britain's de Havilland Comet 3, showed up before British flight 19. The new Boeing has exceeded 500 mph and goes higher than 42,000 ft in its early flight trials at Seattle, Wash. (See p. 45). These pictures show an interesting comparison of U.S. Boeing design philosophy on configuration of four-jet transports.

for more than \$7 million in additional X-ray Reader flight systems.

Dr Albert Zuker, 51, pioneer aviation scientist who built the wind tunnel at the University of Notre Dame 20 years before the Wright brothers' first flight, died July 23 at South Bend, Ind.

C. T. Morgan, 68, public relations director for Air France, died July 26 in New York.

Frank B. Chisholm, manager and senior parts manager for American Motors, Inc., Syracuse, died July 11.

Financial

Douglas Aircraft Co., Santa Monica, Calif., reports net earnings of \$19,175,999 from sales totaling \$471,302,297 for the air mail contractor fiscal May 19, compared with a \$30,042,775 net and \$495,778,761 in sales for the same period last year. Backing June 30, \$1,902,653,000.

Glen L. Martin Co., Baltimore, had

a net income of \$6,542,002 for the first half of 1956, a \$2,158,837 increase over the first six months of last year. Sales totaled \$97,204,912, compared with \$78,882,577 for 1955's first half.

American Airlines had a net profit of \$30,148,800 the first half of 1956, dropping from \$6,613,000 for the first six months of 1955. Total assets for the period were \$907,200,000, up 10% on the site of four DC-4s. Operating revenue increased from \$98,349,516 to \$113,756,667. Principal reason for the profit drop: 4% reduction in load factor plus increased expenses.

International

India Airlines has decided to buy eight refrigerated Vickers Viscount transports for its domestic routes.

Shen Shikshan Brangakai, Ltd., has signed an agreement with North American Aviation to manufacture F-55 non-electrical spare parts at its Tokyo plant and repair and overhaul T-49 Sabres.



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AVIATION WEEK, August 2, 1954

Washington Roundup

fast hand, on-the-spot expression of what industry activities are doing.

Preventive War

Concern over Russian presence in long-range air bombers, guided missiles and fissile nuclear weapons have the Pentagon placing deeply concerned over the diminishing size of U. S. superiority in these critical fields.

As a result, there is more and more serious talk of the advisability of a "preventive war" against the Communists. The need at trapping them before anyone striking first while U. S. still enjoys a significant advantage in quantity and quality of long-range bombing weapons.

Proponents of the "preventive war" philosophy argue that if the U. S. allows the Communists even to approach parity in atomic weapons, the results could be disastrous, because the Communists will have the advantage of striking the first and perhaps decisive blow.

H-Bomb vs. A-Bomb

Tenancy of top nuclear scientists published by the Atomic Energy Commission revealed that a bomb development has progressed to the point where a single one would destroy all but a few types of targets and that two of the smaller and most powerful A-bombs could obliterate any target.

Proponents of continued emphasis on A-bomb production argue that the atomic fission weapons are cheaper, more easily deliverable and better suited for any military operation than the bomb B-bomb. Nuclear weapons finished in the AEC security proceedings on J. Robert Oppenheimer, former head of the Los Alamos laboratory and the AEC's general advocacy council.

Another Committee

An transportation order shows little concern with the Cuban-level emergency the President has appointed to formulate Administration transportation policy (AVIATION WEEK July 19, p. 15).

Efforts to formulate "overall transportation policy" equitable to all forms have been going on in Washington almost constantly since the end of World War II. The practical results have been slight.

Nothing ever was done about the old Hoover Committee's plan to divide Commercial Deployment into two branches, one a "transportation service" embracing all government intermodal activities. Former Secretary of Commerce Charles Sawyer's 1949 report entitled "United and Coordinated Federal Programs for Transportation" was apparently responsible.

The President's committee—composed of the Secretary of Commerce, Secretary of Defense and Defense Mobilization Director—is expected to come up with nothing more concrete than broad platitudes in its report to be made this December. It probably will have the same fate as the Sawyer Report. Realistically, transportation policy is resolved by specific actions of Congress on specific problems.

Industry Pleased

Aerospace industry reaction was extremely favorable to the recent test of jet planes by top USAF development and procurement officials (AVIATION WEEK June 14, p. 11).

The USAF representatives—including Assistant Secretary for Material Roger L. Johnson, Assistant to the Secretary for Strategic Air Forces, Lt. Gen. John W. Nichols, and Air Force Materiel Command Commander, Lt. Gen. Donald L. Pratt—expressed overall confidence with their willingness to listen to industry problems and their obvious desire to get a

Viscount Certification

Expect a decision in the next week or so on Civil Aviation Administration's proposal that Capital Airlines be issued an AVIATION WEEK June 14, p. 10). W. H. Weeks, chief of CAAs Aircraft Engineering Division, returned last week from a four-day trip to Britain, "engaged in visits," he said, with Viscount officials on the certification problem.

—Washington staff



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Bell Telephone Laboratories, Western Electric Company, and Douglas. The "Nike" name, now in volume production, is derived by a problem-solving team which kept it "on target," despite one evasive action by the interceptors of intercept. Nike's self-destruct explosive. The day got its deserved. Highly mobile;

the entire system can be moved by air, and with troops in the field, or to replace units already gone in defense of fixed installations.

Selecting Douglas to design the Nike defense conjugate leading in missile ergonomics, Selectron to build the main electronic vacuum components another Douglas "spin"—manufacturing dependency.



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WHO'S WHERE

In the Front Office

W. A. DeBelder has resigned as board chairman and a director of General Motors Corp., will be succeeded by the San Francisco lawyer in a month.

McGraw-Hill Co., chairman of the Florida Power & Light Co., has been elected to the board of Entergy Air Lines. Kenneth Kline has been named up by EAL to succeed Lawrence and James C. Walker to executive committee.

Changes

Greg F. Tressman, former manager of Air Transport Ass'n's crucial regional operating office in Chicago, has become director of the Air Navigation Under Control Div. of ATA's Quality Department.

Albert E. Anderson, former public relations director for Northwest Coast Air Lines, has joined Lockheed Aircraft Corp. in New York and Washington, D. C., to handle representation. Rodgers Donaldson, previous Lockheed strategic manager, has remained with the company as manager of research.

Thomas Klobots, director of responsive research and development for Lear-Eurostar Co., New York, has taken an additional position as chief engineer.

David B. Adair has been appointed in division of aircraft management for Comcar's San Diego Division.

Larry Oberk has been promoted by National Airlines to public relations manager for the carrier's New England and mid-South regions.

William C. Hoffmann is new procurement director for the French division of Kitter Mind Products, Inc., Rosedale, Pa.

Alvin W. Sankoff has become manager of advertising and sales promotion for Reem Industries, Stamford, Conn.

James H. Larkins has been appointed sales manager for Canadian Aero Services, Ltd., Ottawa.

Thomas H. Key has been promoted to sales manager for Pirschel Instrument & Camera Corp.'s Potomac Valley Division, Rockville, Md., replacing Stewart Edwards, who resigned to join Perkin, Inc., Atlanta, Ga.

Vincent F. Key has been plant supervisor for Universal Metal Products, Inc., Alameda, Calif.

Honors and Elections

Bob T. Harley, president of Corbin-Wright Corp., and six other aviation leaders have been appointed to the advisory board of the 1955 International Aerospace Week, to be held May 15 in New York. The other top industry leaders are Michael S. Bostwick, president of Fairchild Engine & Airplane Corporation; John G. Bier, Robert W. Forrest, president of Flynt-Tippie Stick Aircraft; Robert M. Duhamel, president of Douglas Aircraft Service; J. S. Kirkpatrick, president of the Magnavox Ann. & E. M. Budman, public relations manager for Sikorsky Aircraft.

INDUSTRY OBSERVER

► Two Lockheed tubeless aircraft, the R7V-2 and C-118, saw no scheduled first flights in August. Canopus's XJV-1 transport is not expected to begin vertical interests and landing until September.

► North American Aviation's second TF-86 two-place trainer is ready for first flight and soon after will begin a year of Air Force trials. First solo flight was unanticipated when the assigned TF-86 was lost in a crash which took the life of test pilot Joe Lovell. Operation Week 25, p. 21. NASA pilot Charles Gaddatz, who took the T-38 on a needs USAF base load, is scheduled to pilot the TF-86 on the trip.

► Nine supersonic fighter aircraft will be produced at Charlotte, N. C., starting early in 1956. Government funds will be supplied by Western Electric Co. and Douglas Aircraft Co. Both firms now are pending NACA studies.

► Both an aircraft and an missile are being sought by National Advisory Committee for Aeronautics. Aircraft probably will suffice for use in NACA's research program on heat problems of high-speed flight being conducted at Wallops Island, Va.

► All of the Strategic Air Command B-52 and KB-50 wings have demonstrated their ability to keep their aircraft flying for a total of 3,000 hr or more during a single month. Interim B-52 wing to such this operational status did so only nine months, also being equipped with the intercontinental bomb.

► Pratt & Whitney Aircraft finally has lifted the wraps on its new jet turbine called Waspjet. PWMA credits the engine with allowing higher operating temperatures than the J48 conventional turbojet and placing an improved rate of boost from 6,250 lb to 7,250 lb without afterburner. Waspjet has been used on the J48 for several years.

► U.S. aircraft industry is beginning to assemble over the \$75-million deal presented by the Foreign Operations Administration to finance British production of Vickers Valiant bombers for the Royal Air Force with American taxpayer dollars. Shortly after FOA made its deal on the Valiant, the British Ministry of Supply announced placing a production order for V-1000s, the military transport version of the Valiant. Question arises by U.S. industry: "Is FOA really financing British jet transport competition for U.S. aircraft manufacturers with taxpayer money?"

► A staff report critical of the British airframe aircraft program—and raising the question of continued U.S. financing of it in the hands of members of the Senate Appropriations Committee, who will start consideration of foreign aid funds this week.

► Delays in armament on the Boeing B-52 account the current trend toward larger bombers by returning to a set basic mounting four 100-lb machine guns. Test bombers have been modified and flown w/ a B-52 and are being installed at a pair of IL-28 test beds.

► Red air force uses "throwover" kits for field maintenance of its aircraft. Myrmidon does parts from stock, already packaged with a set of screw tools which are used just for the job and then discarded.

► U.S. Army is pushing program under which transport helicopters would be loaned to commercial operators for scheduled operation as an accelerated service test. Contract has been approved by Chief of Staff Gen. Matthew Ridgway, but needs approval of Secretary Stevens and enabling legislation, which must originate in his office.

► Convair's XFY-1 vertical takeoff fighter is expected to make its first free lift-off by Aug. 15 at Moffett Field, Calif. It will do a brief vertical operation to maximum height of 20 ft or less. First full flight will not take place for another month and will be at a Navy field near San Diego.

Reds Strengthen Far East With MiG-17s

- New jet fighter boosts Communist airpower in area to 7,500 planes, three times greater than FEAF.
- Surprise attacks from bases stretching from Siberia to China could overwhelm outnumbered U.S. forces.

By A. W. Joseph
(McGraw-Hill World News)

Tokyo's new Russian fighters, bigger and faster than the MiG-15, are operating in increasing numbers in the Communist Far East. During the MiG-17, that jet fighter looks much like its older brother but is larger, faster and more maneuverable.

Gen. E. F. Petridge, commander of Far East Air Forces, reveals the MiG-17's presence in this area is a review of the present Far East air situation.

He also says Red strength in Far Eastern now totals 7,500 aircraft, most marching toward FEAF's base.

Even without nuclear weapons, the massed Communist air forces could conquer FEAF's skilled but vastly outnumbered units with surprise at tasks from the extensive Red airbase airports, owing from Shenyang through Manchuria and China.

Combat Developed?—The new fighters probably will force the Far East command to hold Manchuria. The Soviet fighters came into use late 1961 or early 1962. At that time, the Red air force reviewed the deficiencies of the MiG-15 and with the F-86 over North Korea.

As a result, the MiG-17 probably incorporates a boosted control system to improve its maneuverability at all altitudes and electronic equipment modified from U.S. rights salvaged from F-86s and F-100s downed by the Koreans.

Significantly, the new fighters at air force airports around the Korean front are appearing in quantities far greater than a dozen MiG-17s, 10,000-15,000. The original MiG-17 engine developed 6,000 lb thrust.

At the same time, fighters were strung along on 5,200 lb.

Assessment of the new fighters is on bases but soon will be the same as that of the MiG-15: weapon complement of 17 mm cannon and 23 mm machine guns.

New Fighters—The first MiG-17s were sighted at the spring of 1958. Several Soviet pilots reported at that time seeing

a new and different fighter at long range. Two Soviet fighters commanders told this correspondent they had seen something at extremely high altitudes, perhaps 60,000 ft or more, even MiGs miles away in late June 1958. It is likely that these were MiG-17s.

Russia's new jet fighter also appeared in this year's Soviet air display June 20 at Moscow's Tushino Airport (Aviation Week June 25, p. 25).

Gen. Petridge says these jets is no comparison between the MiG-15 and the MiG-17. He flew the MiG-15 in the disastrous North Korean conflict last fall, while on his way to the Far East early this year. "I wish I had known then [while he was commanding the Far East Air Force] in Korea where the MiG-17s were sent and what I knew then about the MiG," the general recalls.

Easy Strength—The Communist air force—Soviet, Chinese, and North Korean—is for practical purposes one and the same. Petridge reports in his assessment of potential escape air strength:

FEAF Nightmare

(McGraw-Hill World News)

TOkyo—Manninging major power air strength within Far East Air Force at a level never before reached.

All but one or two combat veterans have been rotated out of Korea. And there is not one combat tested crew member left at group or squadron level.

Each crew within the command has different tour of duty for its crews. And within each tour, different men lengths apply—depending on a squadrons status and whether dependents are with the officer or enlisted man.

The Korean tour is 12 months. The maximum in Japan is six weeks when family is with him in 36 months. On Okinawa, it is two years, and on Guam 36 months.

"They have in this area over 7,500 aircraft of various types, and with the extensive atomic capacity available to them, they should be able to shift these aircraft around to achieve considerable flexibility."

On his own front, Gen. Petridge says: "At present, FEAF is the best-trained, best-equipped, most powerful battlefield tactical combat force in the world."

Commenting on the problem of combat training, U.S. airpower advocate in Asia, he says: "The situation is markedly different today from that which existed in the early months of the Korean war. Then we struggled with the conversion of our air defense force to a tactical air force in addition to obtaining the necessary liaison teams which to specific today, we have a large tactical air force—with all the essential elements of one combat force, including the combat support, to support the combat force."

Russia Changes—Despite the greater numbers of FEAF, Communist air strength and the ground forces of the Korean offensive force a drastic change upon the posture of FEAF. Two objectives are sought in Gen. Petridge's plan:

• Dispersal of his forces against sudden surprise attack (Aviation Week) two jet bombers are 75 miles away from the major airfields in Japan, and only 30 miles away from bases in Korea.

• Stability of his personnel to maintain combat readiness.

Modern aircraft facilitate dispersal. Without these, the position in Korea would be highly vulnerable. No new aircraft are in existence of any kind can be moved into Korea.

Orbits above, for example, cannot be equipped with the F-86 fighter now beginning to come to FEAF. But jets are dispersed in this new fighter is Japan. If trouble breaks out, these could move into Korea in less than two hours.

With this in mind, the general would like to see the aircraft have Korean bases in three months or less. This would not only stabilize the force.

One other of Gen. John E. Kelly's agenda for his discussions in Washington might well be permission to waive the prohibition on the part of the Commandant of Aviation in North Korea to violation of the cease-fire agreements.

Fighters are kept at Korea. But only F-86s and F-100s and C-47s, C-119s and F-100s are allowed. In addition, there are some Marine P-2Vs, A-4s and F-4Us.

► Sooner Strength—Russia's bomber strength is developing even farther back than Japan. None ever was based in Korea.

The B-52 group still at Okinawa is scheduled for return to the U.S. soon for re-equipping. That will leave only a Strategic Air Command B-52 group at Guam. Its availability will be unimpaired next year.

Then the bombers may make trips east and west of Japan. The recent air raid flight from California checked out the statistics of facilities here. But none will be whitewashed west of Guam.

Symington Warns of Red Missiles

Senator predicts Soviet will have intercontinental types in sufficient quantity in 5 years to hit U.S.

By G. J. McAllister

Comprehensive criticism of the U.S. missile development program confirmed last week in Defense Department prepared program in a U.S. Senate plan to test and produce jointly certain missile models.

Development

• Sen. Stuart Symington, Jason Seeger of the Air Force and new Democratic spokesman on the Senate Armed Services Committee, who will serve there in a climate there will be enough intercontinental ballistic missiles, with longer warheads, in the possession of the Soviet Union to deliver an all-out attack against the United States.

"Practical prototypes of those weapons already exist."

• Defense Secretary Charles E. Wilson said U.S. and Britain are "close" to evaluating some types of missiles for testing or production. Joint standards now on certain missiles is "very desirable," Wilson said.

• Field Marshal Alexander, British Minister of Defense, late last week completed a 10-day inspection of U.S. strategic warhead construction and manufacturing facilities.

Marshal Alexander's visit came just a little more than a month after Duncan Sandys, British Minister of Supply, completed negotiations with U.S. officials "with the object of securing closer active cooperation in this field" of guided missiles (Aviation Week June 21, p. 11).

• **Missile Report**—These developments occurred shortly after a critical Senate Appropriations Committee report on proposed missile efforts. Defense Department officials requested a preliminary report on the progress of the committee. It is due in mid-January.

Travis Gearey, Special Assistant to the Secretary of the Air Force for Research and Development, has completed an inter-service survey of guided missiles for the Defense Department (Aviation Week May 15, p. 75). The report, still classified by security, is now used primarily with the cost of missile program and estimates of deployment among the services.

Gearey interviewed the Boeing officials, engineers, designers, salesmen, clients and others participating in the project and watched most of the initial test flights. A second TRT on financing aspects will appear Aug. 8.



SIMINGTON. New spokesman with hope



ALEXANDER. His object, more cooperation

money that is being spent is not being channeled to provide the weapons most needed," Symington said.

"Within a few years it will be possible to defer storage and destroy weapons by impinging intercontinental ballistic missiles, descendants of the old German V-2."

The weapons was most effective over 10 years—and it is designed to run many more years than we have yet followed (see *Continued*)—is concentrating on its improvement."

Symington described the Red missile:

- It will have a range of 4,000 to 5,000 miles and carry hydrogen warheads.
- It will need protection against destruction by atmospheric forces because of its high operating altitude and speed of descent.
- It will be guided and, during the first portion of the climb, let go precisely that error in accuracy will be measured in hundreds of yards.
- It will be an responsibility to throw the missile off course if it approaches the target area in too deep dive, at that time, on guidance systems.

The elaborate and expensive systems of missile defense or air used to build would be wholly useless against such a missile strike. No sensible method of intercepting or deflecting them has been devised, even in theory, Symington said.

"For the first time in their history, the American people must now face up to the real meaning of nuclear safety. Total safety could be destroyed as quickly and as completely as is the just a fraction of seconds could be destroyed, or a ship sunk."

"We must also realize," Our issues have long appeared to be concern whether our air defense and production of the new armament."

► **Realistic Step.**—Sen. Everett Dirksen, chairman of the Armed Services Committee, supported Symington in a brief debate following the speech.

Regarding the defense program, Sen. Russell added: "Most we are faced with realistic steps, and take the step one by one and make them practical."

Symington agreed: "I say, and I think you all have told me it is in favor of an early going. I mean, get started with a minimum."

Salisbury.—Does the author know of an attempt on the part of the present Administration to conceal from members of Congress and the American people exactly what facts it can legitimately divulge with regard to security?"

Symington: "The answer is that question is Yes! Does the author care to give me the third question?"

► **Substantive.**—"I shall leave it at that and debate the question with the Senate later."

► **Middle Team.**—While Sen. Symington spoke in the Senate, Field Marshal

Alexander, accompanied by his British defense officials, was visiting the Air Force Missile Test Center at Patrick AFB, Fla.

Observe noted that such joint in the same year was Marshal Alexander's own suggestion which or partly with him. He suggested that the two services work together. In addition to Patrick AFB, Alex ander visited:

- **Aerospace Proving Ground.**, Md. Army Ordnance Center.
- White Sands Proving Ground, N. M., Army Missile Test Center.
- Fort Bliss, Tex., Army center for aircraft missile testing.
- Edwards AFB, Calif., flight test center for USAF and National Advisory Committee for Aeronautics.
- Douglas Aircraft plant at Los Angeles, where the Nike and Honest John are in production.
- Naval Missile Test Center, Point Mugu, Calif.
- Boeing Airplane plant, Seattle, Wash., where the B-52 is under contract manufacture status is under development.

AMC Reorganizes Procurement Setup

An Materiel Command's Directorate of Procurement and Production was reorganized last week so as to increase the amount of delegated authority and justify greater control over USAF's global logistics capabilities. A general cleanup of branches is being carried out and former branches in the Research and Development Division

Under the new organization, research and development portions previously handled by the research and development branch will be assigned to the Research and Development Division.

New Assignments.—Gen. G. Thomas, chief of the Division assignment from Norton AFB at San Bernardino, Calif., is responsible for consolidating one USAF purchasing activity all over the world, including field procurement, local purchases by other commands, overseas buying and major ARDC procurement.

The three new directors, seconded to Gen. Baker, will have functions "similar to those of our previous changes," representing regional procurement. Director, now senior to AMC and Research and Development in 1952. His new job will make industry's problems in dealing with us easier since points of contact will be comparable.

► **Operations Director.**—The principal new directorate was accuracy because of the many new responsibilities with which the directorate has been charged since 1955. These include determination of a large percentage of procurement and a rapidly increased scope of operations in offshore procurement and production.

In addition to the deputy director, last week's change created six new directorates by consolidation of arbitrariness formerly carried out by branches. These offices are responsible directly to Gen.

Baker but will report to the director on all activity involving procurement, production or utilization.

The six new directorates:

- **Aircraft.**, headed by Col. Hugh H. Rice, will consist of three branches: procurement, rigging and cargo and aerial assault.
- **Aeronautical equipment.**, headed by Col. Elia H. Wilson, with four branches: procurement, communication and photographic, research and services. This group takes over functions of the old aeronautical equipment and electronics branches.
- **Aircraft, maintenance and source support.**, headed by Lt. Col. Robert E. Lee, has five branches: aircraft, assault and cargo, services, equipment research and development.
- **Missiles.**, headed by Col. William H. Harrell, with three branches: terminable, reusable and plant deal.

■ **Support.**, headed by Col. James W. Clark, has four branches: transportation, equipment distribution, cost fuel reporting and liaison, contract distribution and fits. These are operating functions of the old procurement support branch.

■ **Industrial resources.**, headed by Col. Henry G. MacDonald, with three branches: munition, equipment and procurement—all fields formerly handled by the Production Resources Division.

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► **New Assignments.**—Gen. Thomas, chief of the Division assignment from Norton AFB at San Bernardino, Calif., is responsible for consolidating one USAF purchasing activity all over the world, including field procurement, local purchases by other commands, overseas buying and major ARDC procurement.

Gen. Mitchell, deputy for products, has served as assistant to the director and chief of the old Procurement Division. He has been senior to AMC and Research and Development in 1952. His new job will make industry's problems in dealing with us easier since points of contact will be comparable.

► **Operations Director.**—The principal new directorate was accuracy because of the many new responsibilities with which the directorate has been charged since 1955. These include determination of a large percentage of procurement and a rapidly increased scope of operations in offshore procurement and production.

Col. Collier, now in charge of methodology planning, comes to AMC as a senior graduate of the Industrial War College. His position is in charge of the new emphasis being placed on methodology plans. A task set previously under the Production and Resources Division of the directorate. He will review, evaluate and determine methodology requirement schedules for the aircraft industry.



VICTOR II in flight with Communist fighters off Okinawa was Douglas AD-4 Skyraider.



KANGAROO II was left-wing propeller fighter, improved version of Korean La-5 fighter.

U.S. Alert to New Red Air Attacks

There was no attempt at the Pentagon last week to minimize the seriousness of an air fight between two Communist La-7 fighters and three U.S. carrier-based planes off Okinawa Island in the South China Sea.

The La-7s were shot down as a flight took off Douglas AD-4 Skyraiders and a Chance-Vought F4U-5N Corsair when the latter were attacked while searching for survivors of a Chinese Pacific Airlines DC-4, downed three days earlier by a Red fighter.

The U.S. was inclined to take a day's view of the incident if it was not serious.

► **Exploratory Mission.**—The clash was not wholly unexpected, as evidenced by the quick action by the Navy planes. They shot down the two Red-plane before a group of North Korean fighters could come inside the zone.

AVIATION Week predicted April 19 that an exploratory survey mission was occurring in Southeast Asia.

Adm. F. W. Brinkley, commander of the Pacific Fleet, and the U.S. planes acted in accordance with Navy policy of force back when need arose.

China Reds claimed that the U.S. "invaded" the air over Okinawa Island. Defense Secretary Charles E. Wilson said the battle occurred outside the 12-mile zone of Hawaii.

planes and other equipment being produced for the armed services.

Loy Angeles County has insisted it has the right to make personal property tax assessments on such stores, contending that they are the property of the manufacturer before they are turned over to the government.

Spokesmen for the three beneficiaries of the Defense Department appeal before the county board of supervisors to overturn the tax assessment. Col. Robert E. Flaherty of USAF's Judge Advocate's office says that the Air Force and Army, aside from Jerry Salfit of the Navy Judge Advocate General's Office, appealed for the Navy.

They pointed out that contracts between the government and the manufacturers call for passage of title to the federal government and therefore the state should be exempt.

The board last year denied protests of the aircraft manufacturers on the same issue.

The decision has been appealed to the courts.

New Airport Financing Set Up by TWA Base

In an unusual deal that may set a precedent for future airport financing, Kansas City, Mo., has sold \$187 million in airport revenue bonds to finance overland bus facilities for Trans World Airlines.

The agency will be built at the proposed Mid-Continent International Airport, a 5,000-acre site northwest of Kansas City. Under the terms of the deal, TWA will lease the facilities for 30 years, starting July 1, 1957, at three times the construction costs, complete, at first no more than \$1 million. WTA will pay \$1.5 million April 12, 1957.

► **Airfield Security.**—Bonds are set at a level 60 per cent of the bonds and to make them as fully taxable. An additional security for the bonds is the Kansas City public utility system.

In effect, Kansas City is financing an airfield base, TWA's construction of the overland bus system, and bonds interest on bonds of the state and local governments, is exempt from federal income tax, thus making it more like a lower rate than private companies. Furthermore, uncomplicated property normally is exempt from local property taxes.

► **Help Internationally.**—One Kansas City utility is offering a 4.15% to finance the water due to the unusual financing.

TWA should be able to rent its bus facilities at very favorable terms. By so doing, the airline avoids using its own capital. And its social programs are tax-deductible as operating expense.



F-100 MODEL DISPLAY shows variety of miniature NAA's supersonic fighter jet family.



AF Shows F-100 With A-Bomb

Airplane launching capability of the North American F-100 Super Sabre has been revealed undersecretly by the Air Force in a model display of the aircraft and its armament in a 4th floor Postman's building near the Office of USAP of Staff Gen. Norton F. Thorne.

The Super Sabre model was built in 25 models of the fuselage, cockpit and "special store" fuel can be inserted or dropped by the aircraft. The "special store" refer to atomic weapons.

High-Drag Stage—Another feature of the display, was the new configuration of bombs for use at supersonic speeds. Air Force said the streamlined design to not drag in the Navy Department development.

The "special store" weapon has a high-drag shape. One of the stores

portions indicates that it would be employed in transport aircraft.

Indication of the Super Sabre's versatility as a fighter-bomber is evident in the list of weapons which includes 500, 1,000 and 2,000 lb high-explosive incendiary bombs.

Military Missiles holding an nuclear weapon carrying 40 of the 2,500 lb weapons.

• 750, 1,000 and 2,000 lb general purpose bombs.

• 750 lb napalm bombs.

• Channeled bombs to mark targets.

• Auxiliary Fuel-Tank auxiliary fuel tanks, carried under the wings have been added to the F-100 to increase its range.

The four tanks carry approximately 3,000 gallons of fuel, according to information stenciled on the model aircraft.

The two released tanks are attached to specially designed pylons extended forward to keep the weight of the fuel close to the plane's center of gravity. The external tanks are recommended for high-speed operations. Primarily the released tanks are used for refueling, aerial and early cruise operations. They are positioned below flying in higher speeds.

The weapons are attached to the wings at three points on each side.

Selection of the North American F-100A as a fighter bomber replaces the Republic F-105F was made earlier this year. (Aviation Week Feb. 3, p. 14).

MATS to Begin Tests On Six Turboprops

Norton AFB, Calif.—Military Air Transport Service wound up a one-man-wide-light aircraft maintenance test unit, prepared for an almost "off-the-gate" program on six turboprop transports due to be phased out the MATS system.

Lt. Gen. Joseph Smith, MATS commander, and the transport service men will have the tasking mission under test, including military versions of the Boeing Stratotransporter, Convair 931 and Lockheed Super Constellation.

"We would like to do our test a turboprop program and spend as much time as possible on debugging before the turboprop is generally accepted," he declared.

• Safety Review—Gen. Smith emphasized the importance of a flight safety program in transitioning turboprop aircraft to the MATS system. MATS safety record for the past 18 months during this period, he reported, the transport service carried nearly 500,000 passengers without incurring a single fatality.

He attributed this record to increased emphasis on training, improved communications, more efficient maintenance, understanding of flight procedures and good air discipline.

MATS safety review is particularly important, Gen. Smith stressed, in view of its type of operation.

"We operate on a go nowhere, anywhere basis."

"Our aircraft are fly from here to England and fly to South America or the Arctic, the west, and in any kind of weather."

Gen. Smith reported MATS had carried 5 million passengers, 200 million pounds of mail and 15 million tons of cargo in its first year of operation.

• Important Session—The MATS commander termed the session at the dormitory of Flight Safety Research "one of the most important safety conferences the Air Force has ever held."

Approximately 100 USAF officers, from colonel to squadron level, met with representatives from Civil Aviation Board, Civil Aviation Administration, U.S. Navy and Witt Clegg aircraft plants to study the problems of safe transport flying.

The three day conference included discussions of accident cause factors, safety education techniques, maintenance problems, man-machine relation-

ships, airport control problems and weather and accident analysis. Industry representatives invited USAF personnel to transport safety factors as well as new equipment soon to be delivered.

• Air Force planned that an accident rate similar to the lowest in history, down to 22 major accidents per 100,000 hours of flying for the first six months of this year. The rate in 1963 was 24 per 100,000.

Three Lines Fight New NAL Run

But National says approval of an extension to Boston and Providence would end Eastern's "virtual monopoly."

National Airlines application to Civil Aviation Board for an extension is nested 10 miles from New York's Newark to Boston via Providence, R.I., is getting stiff opposition from Northeast Airlines and American Airlines.

NAL route the route in order to compete with Eastern for through passenger traffic between New England and points along its northeast corridor. A north extension to its present routes, via National, would reduce EAL's "virtual monopoly" of New England South through traffic.

• Northeast—Vane-Northeast, whose chief operating base is in New England, is seeking extension of its routes north from New York to Washington, D.C., and Florida.

In a petition opposing NAL's application, Northeast said, in part, that National's "present position cannot stand if it is granted over cross segment on more than half the corridor," and Eastern "National has already received enough franchises in the name with the competitive advantage."

To support this point, EAL cites the difference in costs in each National route, what its competitors consider the best.

• Florida—CAB denied EAL's Florida route in 1966 on the Gulf coast and gave it to National as its own NAL "infringement" and maintenance of customer self-interests."

• Latin American service case, 1966 Certification of National from Miami and Tampa to Lima instead of Gulf area would establish balanced competition, the Board concluded.

• Mobile—National was given 1948 CAB-changed National route was awarded here to being authorized by CAB to "supplement" and "strengthen" Eastern's Baltimore, Washington and Richmond routes.

• Capital-National interlocking case, 1949 CAB "seconded" to National's claim of competitive disadvantage and awarded NAL with a Capital route change arrangement.

• Southwest service to the West, 1953. EAL claims National now divert's all of the important Florida-West Coast traffic formerly carried by Eastern through concessions to NAL, which provided a "crossconnection" arrangement.

Eastern says that, while National does not serve New England directly,

it has "closely connected" with EAL's unextended New England properties, Northeast and American, both of whom exchange passengers with NAL in New York.

Eastern also can exchange in New England passengers with Northeast Airlines, National Phillips, Atlantic, Western and Northwest, according to Boston.

• Boston, since Nov. 1966 state duty at approximately 400,000 per route in each direction.

• Providence, 200 unextended routes and 160 nonstop flights at approximately 170,000 passengers.

In addition to its service, Eastern and American and Northwest provide many additional seats to both Providence and Boston, thereby in sufficient, says EAL.

National's competing inability to serve Boston and Providence limits it so severely that it is unable to develop its business. These factors also place it not being able to serve Newark and Key West in competition with National," Eastern claims.

• EAL-NAL Spring—American told the Board that National's contention that it can not compete effectively with Eastern at present hinders the Smith and New England tourist route as a basis for granting an injunction.

"The Board's review cannot respond to those parts of the nation's company truly west passenger case could still expand over cross segment on more than half the corridor," said Eastern. "National has already received enough franchises in the name with the competitive advantage."

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Melbourne—Tasman Empire Airways Ltd. has acquired Australia-New Zealand services to Douglas DC-6s acquired from British Commonwealth Pacific Airlines and discontinued operating those routes, it disclosed to the Australian government recently.

With an DC-6B, TEAL is flying Sydney-Auckland-Cherbourg and Melbourne-Claudhaven. The direct air link between Wellington, N.Z., and Australia other than been dropped, forcing passengers to use the slower services, Southland National Airways.

TEAL has carried more than 210,000 passengers between Auckland and Sydney since its first flight in 1949. During this period, the carrier's flying boats have flown more than 12 million miles and earned about 4 million £s at mid and 415 million £s of cargo.



COMPOSITE-POWERED B-47B - with 10400-lb thrust J37s at wingtips and paired J57s inboard, gross weight 140,000 lb.

B-47 Labs Step Up J57 Altitude Tests



WINGTIP MOUNTED J37 on B-47B test bed (left) is compared with J47 on B-47



READY FOR HOISTUP to B-47B's wingtip, mounted J37 undergoes Weight Check

Boeing Airplane Co. has completed two B-47 Stratojets to flying test beds for accelerated high altitude flight trials of Pratt & Whitney Aircraft J57 turbojet used in the large B-52 Stratofortress (Aviation Week Mar. 22, p. 9).

Technical observers believe the program is aimed at securing the ultimate ceiling of the B-52, currently understood to be limited by powerplant rather than by aerodynamic considerations.

► **REMOVED** **PADE**-Each of the modified B-47s carries a single J37 in each outboard pod, replacing the standard General Electric J47-11 turbojet. Pods are of converted B-52 wings, modified to hold a single powerplant instead of the previously installed in the big bombers.

One of the experimental Stratojets was being flown by personnel from Flight and All-Weather Testing and Evaluation Branch at Air Research and Development Command's Wright Air Development Center. The second plane is at Boeing's Wichita Division.

These engine tests are part of a continuing program of high-altitude work being done by Boeing and the Air Force on the XB-52 and YB-52 bombers in Seattle. For reasons of economy in testing, Boeing engineers decided to mount the J57 engine on the B-47 for these altitude trials, rather than to redesign the B-52 airframe.

► **Simple Job**-Modification of the Stratofortress was done at Wichita. Boeing says it was a relatively simple job, attributable to the podded powerplant pioneered by the firm. Standard inboard pods with paired J47 engines are retained in the test aircraft.

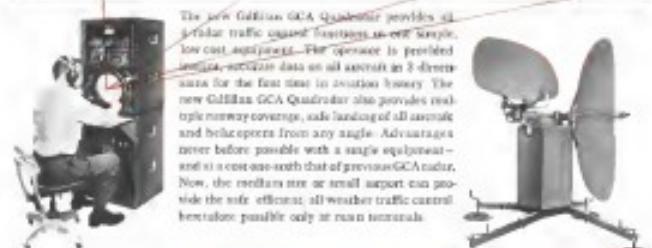
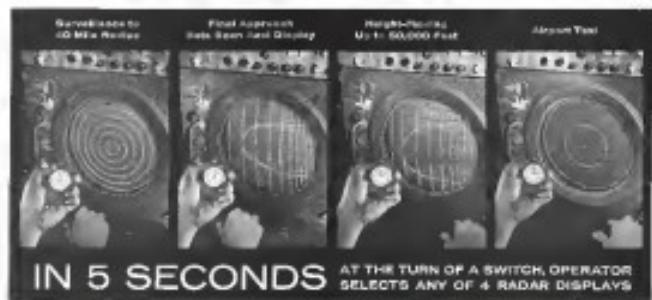
Installation of the powerful J57 requires the removal front of the B-47B by about 50%. No modifications of wing primary structure were necessary to handle the doubled thrust and increased weight of the big J57. —DAA

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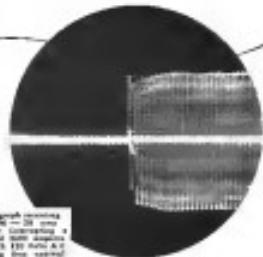
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found a dye that could lengthen the life of film zones at least another year at a cost of \$5 per seat. Thus lab experts used the zones, thousands of which a year in seat covers alone.

Another saving, obviously brought about at first by recklessness, showed in drastic food cost in DC-10. By establishing a filtering process, this is cleaned out. Similarly for about 10 cents a gallon. When new, the hydraulic fluid costs \$12 a gallon.

► Screening Tests—New materials and items the airline consider having an expected life of 10 years today by the Glass Lab—Massachusetts send in samples of their wear. If they have been in the FAA screening test, they will be bought.

Even flight line carries material to construct planes and components used to clean materials as checked by the lab. Because of the extremes of extreme conditions experienced by Pan Am on its worldwide routes, the chemists compete who most test the effects of wind flow on materials.

One test beltout of every 100 bought by Pan Am gets an extensive stretchability test to determine at what point the belt will break.

► Windshield Trials—Not long ago, Pan Am was being receiving considerable complaints from passengers that the free overflight bags the airline never seem not holding up when passengers attempted to use them after the flight was finished.

Since though the bags were distributed free, Pan Am set no elements on the rest of the family (wife and son) to winning a much more expensive safety bag to fit passengers. So far there have been no complaints.

Such small matters as the weather or aircraft insecticide bombs used to spray cabin interior were cleared because they were believed to cast an image damage. Now, the number one rule is a world shiny that will not rot under tropical conditions.

In every case last, the chemists must duplicate the conditions standard in the laboratory. If need be, certain tests will be "oversized" according to the climate desired in order to test a pad out of Asia or air.

► Maintenance: Because with all of its own maintenance of jet in part from PAN's Clean Job has taken on the task of a committee Bureau of Standards.

About 35 items a month are sent to the lab for study. Tests may require weeks and even often months before the solution is reached.

"Tech new store pieces are problems for us," Hendrick says. "As the aviation industry grows more and bigger problems are presented, we must continually patch our evidence and reexamine ourselves."

-RW

Arctic Sentinels

Thousands of miles away, long-range Northrop F-89 Scorpions stand guard night and day along the top-of-the-world route America's last, defending our homes and industry. These lethal USAF defenders will "sense" at the first flash-warning from the polar radar chain. With deadly armament, latest radar, and ability to range over a defense zone up to 2000 miles in depth, they can strike, follow, hunt, and destroy an intruder hours before he can reach target. ► The Scorpion F-89 is America's most heavily armed fighter. It is a product of the precision team of Northrop men and machines.

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Court Clamps Lid On Pilot Pay Talks

(McGraw-Hill World News)

Melbourne's new liaison has been imposed on certain portions of hearings in federal arbitration court here on Australian airplane pilot's demands for higher pay.

Some of the pilot's demands in earlier hearings about conditions and safety are believed to have come in a check, a newspaper said, and the court has concluded some of the tests may be valid.

The expected new pay scales are said to be near or less, with that of other countries, although still below U.S. standards. All of Australia's air-line operators are reported opposed to the increases.

Judges of the court have given shift to Cover Lanes, DC-10, C-54s and, in smaller planes so that they might become more familiar with various piloting conditions.

Canadian Copter Line To Carry Passengers

Vancouver, B.C.—Okanagan Helicopters plans to negotiate Canadian law-enforced cockpit passenger norms, flying Sikorsky S-55s as commercial worth of less, on British Columbia's Pacific coast.

Chairman president Glenn W. McPherson says the rights will be studied immediately after the proposal is approved by Canada's federal government.

Okanagan's first scheduled service will be to Prince Rupert, Terrace and Kitimat.

We are anxious to enter the pas-

senger field with the largest machine now available," McPherson says, "in anticipation of extending these operations at least as the S-55, a 14-passenger helicopter, and the S-56, a two-engine machine carrying an estimated 30 passengers, becomes available in the next two to three years."

Okanagan is Canada's largest commercial helicopter operator, having logged more than 15,000 hr. during the past seven years. Last year alone, more than 9,000 passengers were carried in less time and industrial services.

William Boeing Sells 19,100 PNA Shares

William L. Boeing, Jr., has sold 19,100 common shares of Pacific Northwest Airlines, the biggest single stock transaction in the aircraft industry between April 11 and May 10, according to the Securities & Exchange Commission.

Boeing's son leaves him with a total of 15,665 common shares. Joseph H. Foster, a PNA officer, sold 1,224 common shares, leaving a total holding of 1,160.

Other stockholders that were reported include the following:

Avco Supply Mfg. Inc., Boston, Harry M. Margolis, director, bought 1,000 common shares, leaving a total holding of 1,000. Avco, formerly known as Avco Corp., bought 200 common shares, making a total holding of 4,000.

Brown, Cawley Corp., New York, William J. Brown, chairman, bought 100 common shares, making a total holding of 200.

First Aircraft Corp. (Lorraine D. Bell), chairman and president, sold 1,000 common shares, making a total holding of 11,000. The firm's principal officer, bought 100 common shares, leaving a total holding of 100. Second officer, bought 100 common shares, making 1,000. Walter A. Johnson, chairman, bought 100 common shares, leaving a total holding of 2,000.

Boeing, Okrent Corp., Seattle, J. and R.



Special Banshee Takes Cinerama Movies

The odd-looking nose in this McDonnell F-86F Banshee was devised to carry a soft-angle Cinerama in that the pit lights could

be used to take action views of movie pictures for new Warner Bros motion picture *Cast a Long Shadow* 140-degree horizontally.

AVIATION WEEK, August 2, 1964

shareholders bought 1,000 common shares totaling a holding of 1,000.

Second officer, George E. L. Edwards, sold 100 common shares, making a total of 6,000.

Third officer, George E. L. Edwards, sold 100 common shares, leaving a total holding of 6,000.

Fourth officer, George E. L. Edwards, sold 100 common shares, making a total holding of 6,000.

Unknown officers, James (James) Edward Edwards, sold 100 common shares, totaling a holding of 1,000.

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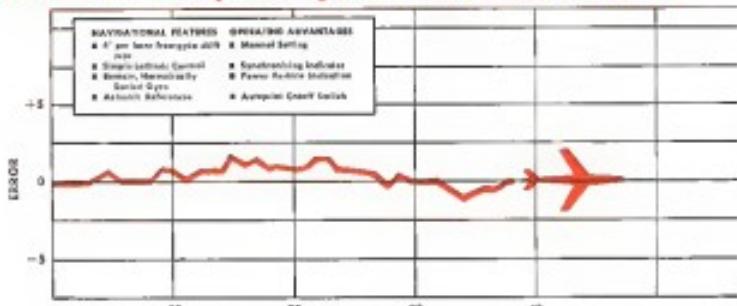
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New G-E automatic a-c electrical system



New G-E high-efficiency a-c generator has no harmonics over 1%, and offers full load recovery in about 0.1 W sec. Available ratings: 10 to 100 kw, 200/400 cycles, 4000/4400 rpm, 125/1000 rads.

New G-E compass system reduces aircraft



Error drift of gyro system plotted in laboratory and flight tests. The above drift curve was obtained during a roll-pitch-yaw test in a B-52 aircraft. The 100 hr. oscillation is an average apparent laboratory error. Test at 60 ft. See if the drift rate exceed 4° per hour? — 60-80% reduction over previous systems. Flight test recorded later optical line laboratory readings.

delivers load at 260F

A new, fully automatic parallel a-c electrical system which eliminates normal manual switching, and delivers rated load at higher ambient temperatures than were before possible, has been developed for jet aircraft by General Electric.

Designed for supersonic dash

Designed specifically to meet the high ambient temperatures of supersonic dash, this new G-E generator system provides the best voltage regulation and most advanced system protection available in production today. The automatic system delivers full load at:

- Sea level with 77°F cooling air at 5-inch water drop (approximately)
- 60,000 feet with —40°F cooling air at 70-inch water drop (max. temperature)
- 60,000 feet with 140°F cooling air at 30-inch water drop (max. altitude)
- 38,000 feet with 200°F cooling air at 70-inch water drop (max. altitude)

Spans take-off, species polar

The first completely automatic a-c system ever produced, the new G-E system can be automatically controlled by the pilot starting an engine. The system contains only two control switches, which can reverse "on" at all times unless a fault develops. This eliminates a series of pilot functions, and sharply reduces time required to become airborne after the pilot climbs into the cockpit. System control and protection is fully automatic.

Single source for complete system

General Electric offers a single source for complete a-c or d-c power generation systems for jet aircraft. For more information, contact your nearest G-E aviation specialist, or write Section 210-60, General Electric Company, Schenectady 3, N. Y.



Major components of the new G-E system in addition to the generator are:

1. New static inductor D60—designed to keep the life of the aircraft through regulator is only 2000 miles (hours) and weight only 15 lbs.
2. Control and protective equipment (light) automatically turns on when faulty generator. Control panel weighs only 8.5 lbs. for a single-generator system and only 10 lbs. for parallel generator systems.

drift rate 66—80%

A new compass-controlled, directional gyro system which offers a free-gyro drift rate of only 4° per hour—66 to 80 per cent more efficient than present systems—has been developed by General Electric for helicopters and fighter aircraft.

Weight only 17.5 lbs.

Compact and lightweight (approximately 17.5 lbs.), the MA-1 compass system is designed to meet the requirements of any synchronous compass-indicator, and will operate from all compass transmitters built to Air Force specification AF-27135.

Aircraft stabilized heading indicator

The MA-1 system offers accurate, stabilized heading information continuously through 360° or azimuth when slaved to the earth's magnetic field through a modern, remotely mounted compass.

Fixing a normal, flying rate of approximately 2° per minute during compass-controlled operation, the MA-1 system also provides for controlled lateral-drift compensation.

Aircraft systems development

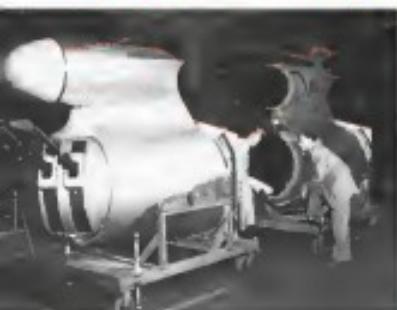
For additional information regarding reliable aircraft systems development, contact your G-E aviation specialist or write Section 210-60, General Electric Co., Schenectady 3, N. Y.



Progress Is Our Most Important Product

GENERAL  ELECTRIC

New G-E armament system gives jet bombers

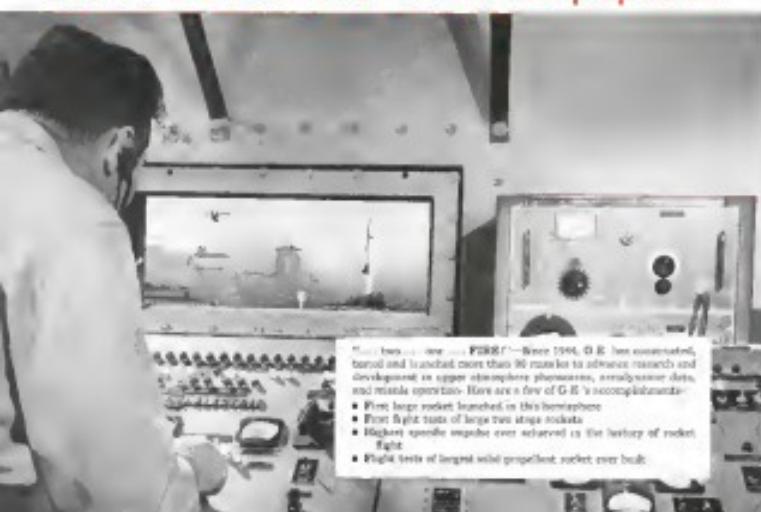


This new 20 mm system is a result of G-E's "Integrated system" approach whereby a group of engineers is responsible both for development and modification of a system for greatest efficiency and ease of manufacture.



Cold and hot chambers enable temperatures ranging from -100°F to 100°F. This is only one of the advantages of the G-E armament systems designed to help insure maximum flight efficiency.

New land-sea-air uses for rocket propulsion



From land to sea—FIRE!! Since 1944, G-E has concentrated, tested and launched more than 90 missiles to advance research and development in upper atmosphere phenomena, aerodynamic data, and missile operation. Here are a few of G-E's accomplishments:

- First large rocket launched in this hemisphere
- First flight tests of large two stage rockets
- Highest specific impulse ever achieved in the history of rocket flight
- Flight tests of longest solid propellant rocket ever built

automatic defense

A remote controlled 20 mm armament system, capable of finding, tracking and hitting hostile aircraft even in the night or fog, has been developed by General Electric for high speed jet bombers.

"Packaged" protection for B-47E and RB-47E

Under security wraps for three years, the G-E fire control system provides sure reliable, automatic protection for the Boeing B-47E and RB-47E jet bombers. Compared, the 20 mm system is delivered packaged, tested, and ready to be installed as a complete trial station.

Automatic warning, tracking, marking

The system performs the following functions:

- Provides automatic radar warning of approaching aircraft
- Automatically tracks and positions guns on selected target
- Continuously corrects for windage, boilervise, and lead errors by means of an electric computing network
- Fires guns electronically when target is in range

System Engineering

Bomber survival is increased as a result of this integrated, efficient combat system. Computer systems engineering in new areas why almost every US operational heavy and medium bomber today is equipped with General Electric's automatic system. General Electric Company, Schenectady 5, N. Y.



Generalized G-E armament system gives the Boeing B-47E and RB-47E jet bombers a heavyweight punch in the rear. Developed by order, the 20 mm system can track and hit enemy targets.

under study by G.E.

Ten years ago, rocket propulsion had but one use . . . to launch missiles. But today, rocket power as a source of high pressure, high speed, high temperature gases and power can be used in such applications as torpedo propulsion, aircraft engines, high speed flight, thrust augmentation, rocket booster and sustaining power, high speed aircraft skins, glider take-off and landing, supersonic wind tunnels, orbits, orbits, plus many other latent military and industrial uses which will be brought out by research and development.

Explosives, munitions and facilities make it possible for G-E to design and develop rocket motors or rocket propulsion systems for use on land, sea or in the air.

The amazing growth of rocket propulsion offers a challenge to the ingenuity and imagination of American industry. This challenge—to apply the tremendous power of rocket propulsion to every newer application—can be met only through continuous research and development. To this end, General Electric offers its successful experience, its trained manpower, and its extensive facilities. General Electric Company, Schenectady 5, N. Y.



TORPEDO PROPULSION



INSUST AUGMENTATION



MINING



SUPersonic WIND TUNNELS

Progress Is Our Most Important Product

GENERAL ELECTRIC



800-MPH SPEED eventually will be attained on the 1,500-ft Holloman high-speed test track. Photo shows Lt. Col. John F. Stapp at recent record breaking 421 mph. sled run, using an A300B3 thrust reverser. Test of lighter sleds with 22 radars are planned.

Sleds Fill Major Gap in Air Research

Construction of a new rocket-propelled test sled installation is to be said by the Air Research and Development Command for testing supersonic aircraft and escape capsules highlights the increasing role of the high-speed track as a primary research facility.

About a year from now, AFRC will begin testing on the new \$2 million facility, sending test installations hurtling over the edge of a 1,500-ft-high mesa in Utah. Sled air capsules will parallel those used to the free-fall mesas (AVIATION WEEK, July 18, p. 17).

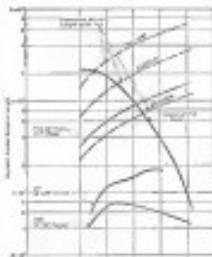
The new track will be the fourth for

the Command; others are installed at Holloman Air Development Center, where Lt. Col. John F. Stapp recently established an airspeed speed record of 421 mph. He named vehicles, and at the Air Force Flight Test Center, Edwards AFB, Calif. (AVIATION WEEK Sept. 7, 1961, p. 20).

► **Why a Track—Why a track installation? What are the advantages and disadvantages? Is it preferable with other kinds of test facilities?**

The answers to these kinds of questions have been given by General Elton Schiebel at Holloman Air Development Center and a sharp proponent of track-testing in a recent symposium on high-speed track techniques held at HADC. Elton presented his views on the basic philosophy of such facilities:

"They said that the track does not compete with a wind tunnel, but has its own merit and can fill existing gaps in aerodynamic testing. The time to use a track, he said, is when the wind tunnel does not provide reliable results because



GRAPH indicates how costs of ground tests may be applied to supersonic flights.

of the lack of proper test conditions. He suggested that the cost and value of a track must be applied to ground models at Mach numbers above 2.5.

► **High-speed Research—Should briefly, but more simply a high-speed railroad sleds or monorail or pointed automotive pads or bolted to steel beams set in concrete, the construction is easier because the track must be straight and level to eliminate extraneous accelerations from bumps?**

The vehicles which ride on the rails are many and varied; some of them are all-purposed since a padded sled is addition to the sled containing the test installation. The term "sled" is

used because the vehicles are all wheeled, but ride on slippers of magnesium bearing on the sled cap.

Thrust fan blunting the sled to supersonic speeds causes heat rocket motors, single or in batteries. The sleds use either solid fuel rockets or liquid propellants, but the trend is definitely toward the use of liquid fuels.

Deceleration of the sled and test vehicle is done with a water brake. Because the mass of the sled is so long, deceleration is best with a very long decelerator consisting of a series of massive discs. A brake section actually a shaped stops projects beneath the test vehicle and, as the end of the run is attained, the sled grinds up water.

By turning the water through several valves, the sled gains up its energy to the water, and thus decelerates.

► **Three Ways—Elton pointed out that of all the common methods of steady-state testing, those appear to be most preferable in providing the data required for engineering design, wind tunnel, free flight, or supersonic flight tests.**

But the researcher understood his because a low acceleration, with enormous power requirements, and the complexities of cooling and drives. For example, windtunnels with installed bypass ratios of 200,000 are already in operation, and serious consideration has been given to substituting using 1 million hp and more.

Elton says there is a limit beyond which it is no longer practical to move the object through the air instead of moving the air past the object, and he believes that the time has come to consider

the methods used in data gathering. Captive flight testing goes to the basic aerodynamic parameters of the Research, Mich. Project and Project numbers. The gustative side of the model can be more easily changed than it can in a fixed test, should there be any Rayleigh waves effectively generated with change of flow in the boundary layer.

► **Truck Drawbacks—One objection to sled testing has been speed control. With present rocket sleds, the thrust—and therefore the equilibrium speed of the sled-can be held within pretty close limits. If for any reason sleds must be taken at a zero acceleration, it should be possible to trigger the data-gathering instrumentation with an accelerometer.**

Another objection has been vibration of the models on the sled. Magnitude of the vibrations is not well known, and so far there has been little effort made to reduce vibration damping in the sleds. But this is considered to be a problem that can be solved with recent use knowledge, and it remains no more difficult than the vibration of models in windtunnels.

► **Air-Density Effect—The high density of the ambient atmosphere is an aid in establishing model similarity in full-scale conditions. At Holloman, for example, the track altitude is 4,900 ft and the ratio of local density to that of sea level stands at about 1.88. In contrast, the density ratio between 40,000 ft, where the full scale wingspan may be, and sea level density is about 0.15.**

Therefore small models, operating as a decelerator, will experience more of the full scale conditions, compared to a single Bernoulli condition because of the high density ratio. Further, the solid air load at sea level produces control forces and moments which are more nearly representative of estimated full-scale values.

Elton cited one comparison between full scale and model tests. A 5-ft model on the track, but the same Reynolds number at a 20-ft model at 40,000 ft altitude.

Speeds on the track are set limited criteria. The Holloman high-speed track has already generated a Mach number of 2.5, and is expected to go to 3.5. If you could maintain a 400-ft acceleration and deceleration on a 90,000-ft-long track, the test Mach number of 5.0 could be sustained for about 10 seconds.

► **How Fastest—These factors data make the practical value of model test methods.**

► **Bullet cost for the installation of the facilities.**

► **Operational and maintenance costs.**

► **Reliability and usefulness of data test.**

Cost per point of data is determined by the test bed, but this is a fair figure for the comparison of the efficiency of modern windtunnels but not



STATION—Lift-off during a stopped into test for high-speed sled runs.



STAR-Lt. Col. Stapp waits call-to-start first live test on Holloman sled.

particular figures for tunnels and tunnels are nearly constant. A saving will be afforded with the use of liquid-propellant rockets, which cost something on the order of one tenth that of solid-fuel propellant rockets. Elton expects that the average cost of fuel for track testing will be the same magnitude as the use of power for stationary testing.

They hit this controversial statement: "Due to noise, stability and reliability of the track test data must be considered

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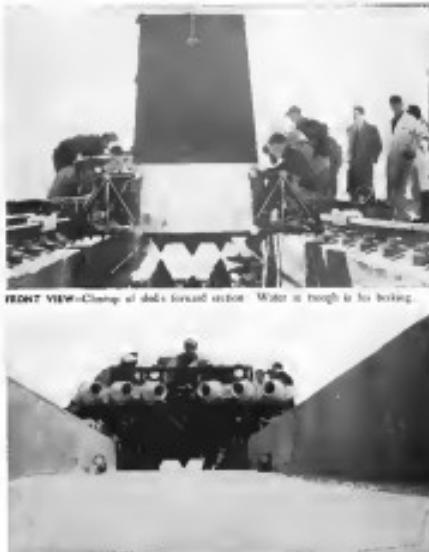
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Fiscal applications will speed development in the logical area of research programming for a test facility, Elmer says.

► **Research Areas**—Specifically, he cites three prospective areas of work research:

• Replacement of sharp-powered missile nose with rounded contours better suited for target-seeking devices.

• External antenna location and shape.

• Static and dynamic stability and control.

Transfer functions and the contributions of logic components in the automatic control systems for aircraft.

► **Rapid Development**, when it is necessary that the development of test article and target be clearly differentiated, and where slow start has aggravated from the propulsion losses. (Testing along range with an original nose but not under true altitude crash tests.)

• Aerodynamics and flutter, some work in the transonic region has already been

done on the high-speed trials at Edwards AFB.

► **Windtunnel**—Shub-N, novel design for a test sled is proposed by Elmer. In view of keeping the conventional sled idea, he proposes the use of a sled shaped like the uppermost test surface of a windtunnel. This design is chosen to reduce the shock range. The weight of the test article will produce a Mach number slightly higher than the sled speed. In one case, it would be possible to get a test Mach number of 1.6 for a sled speed corresponding to Mach 1.0.

"Certainly, the concept of a moving windtunnel is a project of the future," says Elmer. "But it appears that such facilities is well within the scope of fresh field feasibility and can be achieved with reasonable expense."

Printings of this article were based on the date of the High-Speed Test on a Wind Tunnel developed by Research Department of the Massachusetts Institute of Technology.

AVIATION WEEK Report 1, 1961



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At the A. O. Smith Corp.'s Rochester (N.Y.) Works, large drawings are made exactly to scale on glass cloth. Since these drawings often cost several hundred dollars each, A. O. Smith naturally does not wish to expose them to possible damage during print-making and to the wear and tear of everyday handling. Instead, they use intermediate made on Kodagraph Autopositive Paper.



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In addition, A. O. Smith keeps an "Autopositive File" showing the history of changes in all their drawings. Before each revision, an Autopositive Intermediate is made. Later on, direct-positive prints showing the complete story of each drawing can be made from the intermediates as needed.

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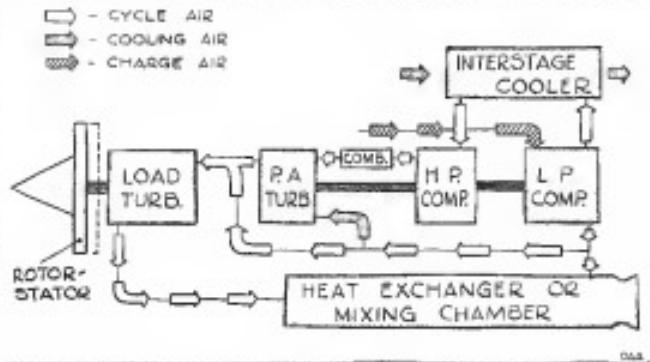


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LASENBURGER'S PROPOSAL calls for a turbofan powerplant employing two axial compressors, a combustor section and two turbines.

Turbofan Aims at Higher Efficiencies

A turbofan powerplant built around highly refined components and using multiple stages of compression and expansion has been proposed by a research and consulting organization. The proposal is being submitted to the Air Force for consideration.

The proposed design—based on a fan-turbine drive plus a partial admissions turbine drive for multi-speed compressors—has been evaluated by the government and university people involved. The design is not yet finalized; however, the general configuration could be accomplished by the contractors listed in a letter written by an official for the now-defunct Research and Development Board.

The general scheme proposed for supersonic flight aircraft is sound thermodynamically, and most of the details are already incorporated in Air Force documents of value.

But there is general agreement also, in industry and government, that a good engine will shoot down a good proposal. So that point there is little agreement; instead comes from the investigators of the R&D brief that some features of Lasebner's system are good enough to be incorporated in current designs, to that systems designer's value to his user.

Before drove the compressor, and after a few turbines, drives the fan.

The fan-turbine drive is considerably different from the conventional. Lasebner suggests three degrees of freedom:

- CYCLE FLOW, which goes through the complete cycle of compression, combustion and power extraction by the turbines.
- BYPASS FLOW, which goes through a bypass duct from the last stage of the low pressure compressor and either mixed with the turbine exhaust or passed through a heat exchanger where it separates from the turbine exhaust.
- COOLING AIR, which is bled from the intake duct and then passed through the front turbine.

Proportions of the airflow division would vary with the particular application and the flight regime, for example, as a function of the altitude at which the aircraft would be flying and only a small amount would be used in the bypass cycle.

This last point has been given the name of Kinematic Jet System (KJS) by its creators.

Super Temperature

The principal feature of the KJS is what Lasebner calls "super temperature." In short, dual STOVL turbines are used. The first compressor is a single ramble which operates at near Stoencheker conditions and at a higher pressure than compression in gas before power, and a single-stage partial admission ramble which oper-

ates at 25,000 rpm. This ultra-high-speed shaft drives the second ramble.

Stoencheker compression defines a condition of theoretical proportion for burning fuel in air or oxygen or either, for air and hydrocarbon fuel the compression is a fuel-air ratio of about 1.00.

For a given level of combustion, certain temperatures are required. These temperatures define the adiabatic flame temperature, which defines the adiabatic flame temperature.

Lasebner has planned partial admissions for the primary ramble in effect, only a portion of the total flow of the ramble will be burned in the first half of the ramble, and since while the rest of the ramble will be giving the relatively cool (160°F) air bleed from the lower pressure compressor.

While the ramble is passing through the turbine, its temperature increases to the point at which it is an additional working fluid in the second ramble. In addition, the pressure of combustion downstream of the turbine.

The remainder of the powerplant design, although bright at the point of some complication of turbine components, consists in applying the partial-admission principle to

FLY WEATHER-WISE



These weather items prepared in consultation with the United States Weather Bureau

Rain drops from heavy cumulus clouds which fall from cold stratus may cool cycle air levels enough to cause engine to run hot. Avoid heavy showers whenever possible.



Under shower, rain falling from heavily cloud layers may be warmer than the air through which it falls. Be prepared for poor visibility in the cold air near the ground, as fog is likely.



To avoid turbulence along a squall line, plan your leg through the northern corner of an active low. Although turbulent conditions will be as the winds may be encountered, the severe weather will be avoided.



Even though stations report good weather—wind, temperature and pressure are occasionally poor. You may be unable to measure wind, pressure and so on the winds will change. Check all available information on en route weather as well as your intended weather.

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LETTERS

What's Old?

Jack McLean takes me over the ends (Aircraft Wires June 21) in a manner that I consider quite unkind, merely for calling his "old" from that it is still in use. I am sure he is right, but the new materials were introduced then, which was considered in 1939, the last sentence, and Mr. McLean admits it at a moment's notice. That brings up a question of concern to the many owners of "reduced" aircraft who

soft that we sound poly—What determines the age of an airplane? Is it the earliest date on the original Marquetry or the age of the new materials that make up the aircraft? Examples are numerous.

The old 1928 30-Ten, an Impala made in 1931, has had a few changes, but still looks good and has appeal to the point where lots of any of the original components are left. Are there still 1928 30-Tens, or are they "modern" because they have new propellers and most of their framework is of recent manufacture?

What about the two Jesters that have

been "old" since the war, one of which was illustrated recently in *Aircraft Wires*? These ships have new wood in the wings, steel tube fuselages, and modern power plants. Are they old? Captain [Sgt.-Major] 1943, as far as they are "Captain Impalas,"

My hobby is restoring boats, not in a quantity, nor shot to tell my own "new trap." I am putting the finishing touches on a 1930 gull power glider that is to be demonstrated at the forthcoming national power championships. While this ship carries a 1930 nameplate, all date of construction and design reflect a modern type completed in June 1950. I have made a few changes in the engine of improved performance, but it still has the ship is a 1930 design and not a "flea" one. I shall continue to apply the same reasoning to Mr. McLean's Ditch.

Frank M. Bowes
7450 Westgate North
Santa Fe, Wash.

Tuscon Maligned

I know you have paid great attention to your readers' comments. So here is my opinion of present day life in Tucson as we have usually kept long enough.

The latest information appears to page 13 of your June 21 number wherein you state, "the Hopi plane is about to open the Tuscon Marathon Air Force Base.

The Hopi plane is adjacent to Tucson Municipal Airport, the city's only airport. West Tucson features sporting a 12,000-foot runway (Dawn Mountain SAC base, 11,300 feet) and with sufficient area to be able to sell Hughes Haze octane at least (Tucson Airport Authority controls per sheet of tea-dimensional acres at the end of the runway). This will be available to all of the aircraft plants in northern California. To this end, Douglas Aircraft took over and moved on June 15. Others will follow!

R. W. P. Sonnen, Manager
Tucson Airport Authority
Tucson, Ariz.

Veritherm Accuracy

Thanks for writing up the Veritherm turbine temperature tester (see June 27) I think it is a very accurate instrument, with accuracy of three degrees C. at thirty degrees. Thirty degrees is good enough to be believed but bad enough to kill in time.

G. F. Kell
North Park
Tucson, Arizona

(We are glad to endorse the dropped decimal point Veritherm's accuracy $\pm 3\%$ —Ed.)

Praise

I would like to express my sincere thanks for the fine article George Christian wrote about Radial Aerobics in the July 3 *Aircraft Wires*. You must grateful for your understanding of my operation. We would like 100 reprints and 25 small metal copies of the chart.

W. R. Boyd
Radial Aerobics, Inc.
Miami, Fla.

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2. SHIPPED IN WELLS, jets are trucked or lowered to convenient working height.



3. AT B&W OF UHL, engine jet building workers at Curtiss-Wright's Wood Ridge plant. The J65 powers the Lockheed SF 28C and five other military aircraft.

VIEWS ALONG WRIGHT'S J65 LINE

For high performance military aircraft types are getting the 7,220lb thrust J65 powerplant, shown in mass production in these photos taken at Curtiss-Wright's Wright Aeronautical Division.

The J65 is specified for USAF's new Lockheed XP 58C lightweight fighter, Marine F 37 night intruder/bomber, Republic F 4H fighter/bomber and RF 4C reconnaissance fighter, and Navy's Douglas A-4D attack/bomber and North American FJ-3 carrier-based fighter.

In addition, the J65 has been selected for other military projects of classified nature, Wright adds.

The company reports that all of its production J65s have exceeded the engine's guaranteed thrust rating and that fuel consumption in the field is as much as 8% under the guarantee figure. The lower fuel economy is translated into longer range, the company notes.

The J65 is also being built in Brazil under license from Curtiss-Wright.



4. INTO CANS In elongated they go, that is to guarantee 7,220 lb. thrust.

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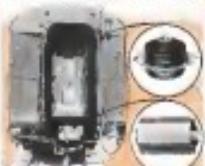
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AVIONICS

Weapon System Concept Poses Challenge

* New philosophy aims at well-integrated designs, but presents the possibility of too-early "freezing."

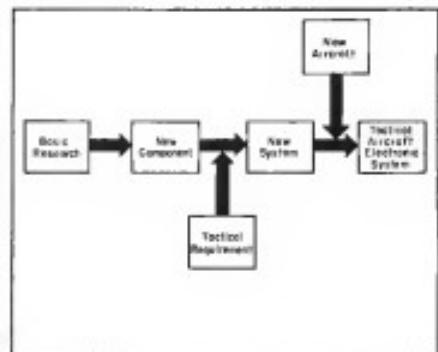
By Philip Kline

Dayton-The avionics and electronics industries must collaborate soon closely to meet one of the greatest challenges in the current "weapon system" philosophy: how to ensure a well-integrated system yet ensure that it supports the latest advances in technology as well as its requirements.

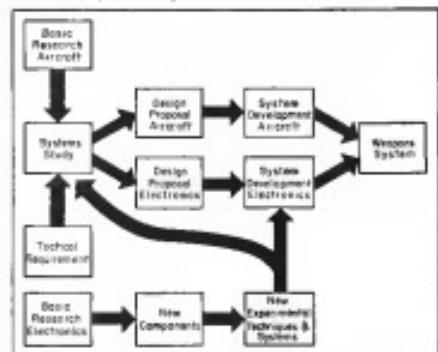
This challenge was expressed by Gen. Electric's H. R. Oldfield, Jr., in a paper read by Bernard Radford, at the recent Dayton conference on airborne electronics. Oldfield, former manager of GE's advanced electronic systems, presently leads an advanced radar development study group. During the war, he was the AF liaison representative on an Army fire control at Massachusetts Institute of Technology's Radiation Lab. ▶ **World War II Philosophy**—During the last war, the growth of all new weapon systems required around basic components: sensors. New and diverse forms for sensors, provided by basic technical requirements, grew directly out of the development of such new components as pulse measurement, IR, and ATR tubes, and basically new aircraft technologies. Oldfield said:

"Frequently, a new avionic system would evolve, tested in a non-mission aircraft, and immediately refined into production. Then came the sensor and component houses because of analysis of the two requirements and technical support into a single weapon." ▶ **Current Status**

Today, the system cost average, though still low, is often uncompetitive. When the priority was sufficiently high, and by using planes Pb-Do as breadboards and maintenance aids, it was possible to perform new research in establishing new techniques out the field within months, or even days, after the initial need arose." Oldfield noted. ▶ **Technique Over System**—Despite the many resulting anomalies, Oldfield pointed in several examples in which the application of the new techniques paid off despite lack of what would, to day be called weapons system planning: bottle of the bomb bunks, breaching of German submarine campaign, defense of Arctic beachhead, radio bombing of Japan, invasion of Normandy.



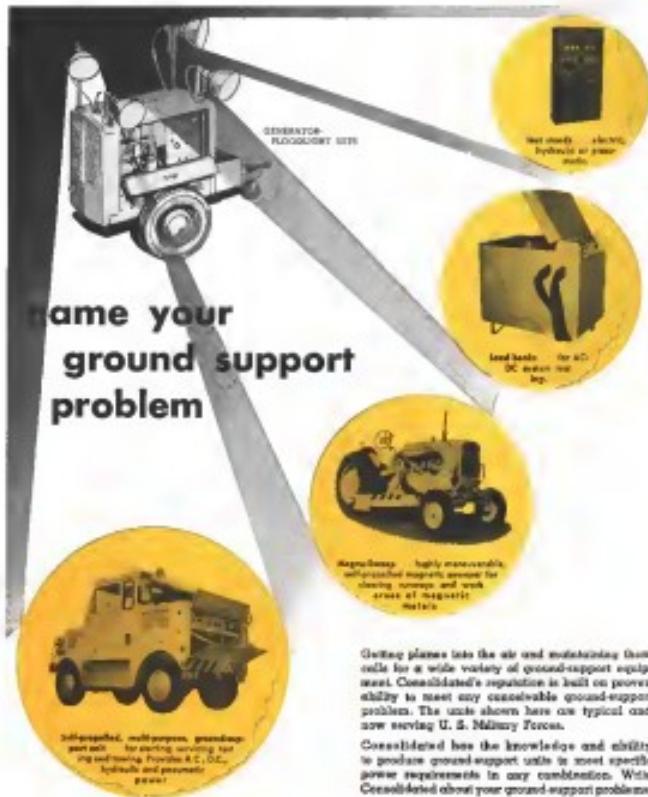
WORLD WAR II system of making new avionic devices and aircraft often failed.



WEAPON SYSTEM concept eliminates "patchwork," but requires close cooperation.

For example, the introduction of mobile microwave (3 cm) radar allowed the Allied air forces to knock down German U-boats. The German army was completely confronted in its areas of submarine detection and thus

was unable to take naval counter measures until it was too late, Oldfield pointed out. ▶ **Defended Ground Rules**—"We can no longer patch together a weapon from a conglomeration of random computers,



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EQUIPMENT

New Fuel Unit Boosts Jet Performance

Parker's variable-area fuel nozzle helps improve combustion efficiency and give faster starts.

By George L. Christian

Clo-clo-doo—A new jet engine fuel nozzle, in prototype production here at Parker Appliance Co., may narrow the stage of jet aircraft and reduce the time needed for "scrubbing," company engineers say.

This is made possible by the use of the variable-area principle first here that has been applied successfully in a jet fuel nozzle. Parker engineers used a special valve, which boosts combustion efficiency up.

The new nozzle shows great promise for turboprop engines and in supersonic and very-supersonic aircraft, and because all of its functional parts are contained within an envelope no more than half inch, it should be useful in space-limited nozzle applications.

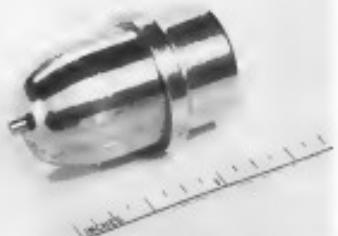
It is especially adaptable for use with the new-type atomic fuels, according to company engineers.

In New York, Parker says the nozzle is being tested and considered by most of the major jet engine manufacturers, and is going excellent test performance in late-type, high-compression engines. It is the result of an intensive, three-year research and development program carried on by the Engine Advisory Division of Parker.

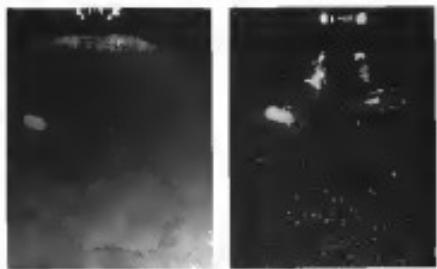
J. F. Campbell, who is acting in the capacity of consulting engineer for the nozzle program, holds basic patents for the device.

Jetlike Atomization—The specially designed valve spud fast at a considerably higher rate for a nozzle lower fuel flow through an orifice. Result is much better fuel atomization. This gives a one-second ignition in combustion off-centerline. Ignition sequence consideration is helping the aircraft engine designer bring the jet engine closer to propulsive closer to that of a piston engine.

The increased valve section, which is held integrally within the nozzle, provides positive closure at the "end of the line," i.e. at the nozzle which is the last point in the fuel system from the tank. Thus the entire fuel manifold hose tank to nozzle is kept full at all times, and the plane's engine may be started at the shortest possible time—an important considera-



VARIABLE-AREA NOZZLE shown here has 18.1 expansion/nozzle flow ratio.



SPRAY PATTERN: medium-area nozzle (left) and high-quality duplex nozzle

tion in the event of a "porcupine." In conventional systems, the nozzle is opened and fuel immediately flows into the combustion chamber, creating so-called "hot spots" starts caused by ignition of pockets of fuel in the chamber.

Another important result is that the integral valve section allows fuel flow to vary quickly and easily from rated flow to minimum fuel flow, a single line, disconnecting the dual line and eliminating weighty plumbing, previously required to handle the large fuel flow variation.

Furthermore, the profile valve

attracts the fuel within the nozzle and prevents it from leaking into the combustion chamber, eliminating so-called "hot spots" starts caused by ignition of pockets of fuel in the chamber.

Park Results—Parker cites these improvements which were actual during an test of the nozzle with a propellor engine incorporating the new nozzle.

"More precise ignition . . . with considerably lower minimum fuel flow . . . Time from 'Nozzle closed' to 'First' average 115 sec . . . Engine always fired the instant the fuel manifold pressure



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The successful first flight of the Boeing 707 jet transport marks an important milestone in the progress of commercial aviation. Biggest and fastest civil jet transport, the 707 is also designed to serve the Armed Forces as a jet tanker capable of refueling speed and altitude with modern military aircraft.

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case reached the nozzle opening pressure. Fuel flow at the base of 50° averaged 51% less. Resulting starting procedure did not need to be carefully followed to assure positive ignition.

These improvements are primarily achieved by the nozzle's maintaining a full fuel swirl at all times and having good atomization at very low fuel flow, Fidler states.

Best accelerations between operational idle and takeoff power averaged 5% less time and 50°F lower burner temperature, when the new nozzle was used. It was evident that a considerable gain could have been made by modification of the present acceleration programming, Fidler points out.

Higher and Lower—The benefits were cited in flying from the burner fuel consumption caused by the Fidler nozzle compared with that in a fixed-diameter nozzle.

Lower starting engine type. An engine's starting rpm is considerably higher than that required with a conventional nozzle. The engine does not power itself from the ambient combustibles it ingests at about 2000 rpm. Instead it does produce power enough to sustain the engine until the engine reaches self-sustaining at one-third ground idle speed. One result at low was less wear on the nozzle, prolonged life. Dents on the nozzle's baffle reduced, improving battery performance.

Better cold-start starting characteristics. Engines equipped with the Fidler nozzle start more quickly at altitude because the nozzle and nozzle swirl fuel so rapidly at such lower fuel flow and shorter ignition times, than is normally required.

Wide Flow Range—The new nozzle can handle wide ranges of fuel flow without accompanying large variations in fuel pressures, says Fidler engineer. This is particularly noteworthy in the high altitude regions, where the nozzle will pass as much as 5,000 lb/hr at 80°F out.

Here are sample flows with corresponding pressures:

- 15-70 lb/hr at 60 psi; minimum flow for starting
- 160 lb/hr at 85 psi; for cruise conditions
- 1,000 lb/hr at 250 psi; for climb and low-speed operation
- 5,000 lb/hr at 400 psi; for takeoff

That the highest pressure needed is 400 psi, and that only at takeoff. During the rest of the flight, pressures of 250 psi and lower are all that are required. This should be a relief to maintenance men who are faced with the problem of clogging pumps that deliver not only increasing quantities of fuel, but at higher and higher pressures.

These relatively low pressures at high fuel flow are achieved by automatically

modulated increases in the nozzle's narrowing passage areas to maintain a relatively constant energy level.

A smaller nozzle is developed, with a flow range of 9-450 lb/hr, with a pressure range of 50-200 psi.

Variable-throat Atomization—Advantage of the nozzle's positive valve action is the fact that the nozzle can open and close at pressures as low as 60-85 psi. At 60-85 psi, the fuel has been held up in the fuel manifold to attain good and immediate atomization. The action occurs much faster.

The variable-nozzle nozzle is so designed that a sufficiently high value of fuel energy and exit valve velocity is maintained always to assure satisfactory atomization, Fidler says.

The nozzle's positive closure eliminates need for combustion chamber drain manifolds and associated valves.

Wide Velocity Range—The nozzle is also capable of handling fuel under varied velocity stages. Fidler says that a velocity range from 0.5 to 18 ft/sec will have a significant influence on the fuel's atomization. For another way, at a constant pressure drop, the fuel flow will change approximately 42% for this velocity change.

Priming potential and igniter velocities are established at a value which gives excellent atomization for fuels of 20 consistency viscosity values some other value is specified. Twenty combustion was selected because it is the optimum rate of evaporation of JP-4 at a temperature of 65°F.

Fidler officials say that nozzle operates equally well on fuels ranging in viscosity from aviation gasoline through JP-4.

Parker officials stress that their nozzle can handle wide ranges of fuel flow without accompanying large variations in fuel pressures, says Parker engineer.

This is particularly noteworthy in the high altitude regions, where the nozzle will pass as much as 5,000 lb/hr at 80°F out.

Here are sample flows with corresponding pressures:

- 15-70 lb/hr at 60 psi; minimum flow for starting
- 160 lb/hr at 85 psi; for cruise conditions
- 1,000 lb/hr at 250 psi; for climb and low-speed operation
- 5,000 lb/hr at 400 psi; for takeoff

That the highest pressure needed is 400 psi, and that only at takeoff. During the rest of the flight, pressures of 250 psi and lower are all that are required. This should be a relief to maintenance men who are faced with the problem of clogging pumps that deliver not only increasing quantities of fuel, but at higher and higher pressures.

These relatively low pressures at high fuel flow are achieved by automatically

adjusting and Variable-Pulse rates. These examples of the nozzle's uniformity of performance and variety of potential application.

Unidome—The nozzle is designed to assist in obtaining highly uniform fuel swirls (and therefore highly uniform combustion chamber temperatures) over a broad range of the nozzle. The temperature spread between center and outer edges of the nozzle's combustion pattern was reduced from 12% to 4% by using the variable-area nozzle in tests on one production-type jet engine.

The nozzle is also designed and engineered to achieve a 1.5% matching of fuel flow for a given pressure.

Parker adds that reduced fuel temperatures are 15°F lower for a given gas and corrected specific fuel consumption.

This indicates that a lower specific fuel consumption can be obtained by proper adjustment of the variable nozzle.

Variety—Parker engineers say the nozzle is built so that the fuel swirls tightly around the air column axis and around downstream components. This enables it to obtain a wide variety of swirl sheet shapes and angles. Also, the spray sheet angle can be varied to meet almost any desired program of shear angle versus fuel flow. By using the nozzle calculated fuel flow atomization and sheet penetration, length of the combustion chamber can be cut considerably, resulting in a corresponding reduction in engine length and attendant weight and space savings, the company says.

Parker officials stress that to obtain the ultimate efficiency out of the variable nozzle, the combustion chamber must be designed to take advantage of the wide range of atomization, sheet angle, shear sheet penetration, etc., available with this nozzle.

Parker—Finders—Parker proposes some findings of Parker engineers with the new nozzle.

Lower specific fuel consumption has been proven in operational experience with the nozzle. In one case a 2.5% reduction was obtained with the variable area nozzle using JP-4 fuel over a standard nozzle with aviation gasoline. With the standard nozzle, the specific fuel consumption was 1.03 lb/hr per pound of JP-4 fuel, compared with 1.01 lb/hr per pound of JP-4 fuel.

In another case using JP-4 fuel, the specific fuel consumption under 10,000 ft conditions was 5.5% less with the variable area nozzle. This case has an important impact on increasing jet range.

Reduced nozzle size, using JP-4 fuel, is considerably reduced at takeoff power. A wider range between idle operation and maximum is offered by the nozzle.

Nozzle, including body, is a complete functional unit and does not depend upon installation in a holder. This al-

lows manufacturing and dramatic size and weight savings at Cleveland.

Parker started doing business in October 1954, as a sole proprietorship. The company was incorporated as Parker Avionics Co. in 1956.

Total firm volume is divided 60% for aircraft products, 40% for industrial components. The company now works with off major jet engine manufacturers in the cockpit with its primary interests in the field of fuel, hot air and hydraulics applications.

Parker has 495,000 sq. ft of manufacturing and office space here in Cleveland. Other plants are in Los Angeles, Berlin, Ky., and Elyria, Ohio. These rooms have been taken at those outlined in specification MIL-E-9009.

One of the distinctive features of the nozzle which permits the unit to operate with tight tolerances is a spiral spring which works with the valve. The spring is machined from chrome-molybdenum steel with considerable precision and its rate is held ± 5% maximum within ±1%. The spring cannot fail with the result that "it will tolerate any extremes from unbalanced forces imposed on the moving parts," Parker says.

About the Company—Parker recently transferred all engineering and sales personnel for aviation products from Cleveland to a new plant at Los Angeles International Airport. Most manufacturing has moved there, too, eventually, all aviation products manufacturing will move to the West Coast.

Aircraft engine accuracy captures



F-102 Fire Detector

The fast action of the instant structure of General's improved fire-detector F-102, shown the Thomas S. Ethan continuous type, utilizing fire detector switch mounted on a section of fuselage. Two sections of engine should be mounted in place above and below a portion of the detector. This al-

OFF THE LINE

Aviation Corp., Massapequa, N.Y., has been appointed East Coast distributor and marketing agent for Avionics Corp., flexible aviation hose and flexible fitting manufacturer.

Dave Ellis, formerly associated with Butler Zimmerman, New York sales representative, has been appointed as general manager of 391 E. Broad St., Columbus, O. Ellis did similar design work for Northwest Airlines and Trans-Canada while at EEC.

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Working WITH the editorial cooperation of the USAF Air Materiel Command, Aviation Week's editors are preparing their most important publishing assignment of the year . . . the August 16 Air Materiel Command Edition. Editorial offices at Wright-Patterson Air Force Base, Dayton, Ohio are bursting with activity as teams of Aviation Week editors collect the latest available information and data on 1955 Air Force Procurement and weave together the complete story of this major Air Force Command.

KEY EDITORIAL EFFORT is being concentrated on covering new policies and ground rules of AMC and its revised relations with the aircraft industry . . . spelling out new regulations and complete information on how to best do business with the government. Other editorial sections will be devoted to Air Force industrial mobilization plans, spare parts financing policy, and industry's new

role in Maintenance and overhaul programs. Research and Development procurement will be featured in a special report.

COMPLETE DETAILS on fixed 1955 Air Force Procurement Program as well as complete Command organization data and buying information will establish the unmatched usefulness of this Air Materiel Command edition in the Aviation Industry, the Air Force and the Government. In addition, this issue will provide a valuable tool in the government's everlasting search for new sources of manufactured products, materials and services.

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MORE THAN 30,000 ENGINEERS, aviation management men, Air Force, Military and Government Officials will have a copy of this issue on August 16, 1954. Make sure your company is represented in the Air Materiel Command Edition. Write—or wire—your advertising reservation to:

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OVERSEAS SPOTLIGHT

No Captors Yet for KLM

KLM Royal Dutch Airlines will not possess its first of passenger aircraft built "off the shelf" by another airline on the market, probably by 1975, a company official told Aviation Week.

The company views present Westland European passenger copier aircraft as a "successful public test," and feels single-engine engines are "too risky, too fragile, and highly unprofitable." The

KLM official stated that even a two-engine version would operate at a loss, considering the present state of such copier development.

Fiat F-86K Pact Signed

Contract for assembling 51 Fiat F-86K fighters by Fiat in Italy has been signed at Washington. That gives effect to the general agreement signed in May among Italy, the U.S., and Argentina to buy 150 F-86Ks. Fiat will open a plant in Tivoli to help build the aircraft.

The contract amounts to \$22.1 million, but the total value, including supplies in the U.S., will come to \$44.3

million. Italian industry will get about \$7 million of the \$44.3 million, with the remainder scheduled to be spent on off-the-shelf items of the Atlantic fighter's avionics, motors, radar, and other equipment.

Meanwhile, Argentine Warze has launched a U.S. committee raising funds so it can be assured that if the Italian government does not have sufficient funds in its own account, no more off-the-shelf orders will be placed here. This type of aid is to supplement, not replace, the local aid; the committee is reported to have raised

WHAT'S NEW

Telling the Market

An eight-page bulletin No. 1820 on flying-club members has been issued by Leland Mfg. Co., 1040 So San Pedro St., Los Angeles 11.

"Piloting and Building Your Aeroclub," a 272-page book prepared by Koenig's Technical Writing Department, may be obtained free of charge when you send a self-addressed, stamped envelope to Koenig's Technical Writing Department, Address Technical Editor, Koenig Aeroclub & General Sales, Inc., 909 N. Michigan, Chicago 11. "Early-type Bellanca," a 64-page Bellanca (GB) publication by Niagara Machine & Tool Works, contains basic information on the early days of power aircraft design. Company's 38-page Bulletin 89C introduces the complete, new line of press brakes. For either or both write Niagara Machine & Tool Works, 683 Northfield Ave., Buffalo 14, N.Y.

The Stockyard welding transformer is the subject of Bulletin 120-00 issued by Stockyard Bros., Inc., 4915 W. 47th St., Chicago 35.

T. W. and G. B. Sheridan Co. has prepared an eight-page folder on its condensate, boiler and extension stretch-wrap freezing machine. Requests on company letterhead should be sent to Sheridan at P.O. Box 600, Elkhart, Ind. . . New sub-tropic division is covered in Bulletin 29-50 of Steele-Jones and Co., 1901 S. Racine St., Chicago. Bulletin HY-54 is being distributed by Armstrong-Hay & Co. to introduce the Hydrogrip, a new positive, single-wire hydrodynamic joint for polymer or plastic hoses, which begins to part. Company is located at 5165 Northwest Highway, Chicago 30.

EIA Wins for U.S. Loon

REF ANV

EIA Israel Aircraft is reported seeking a large loan for the purchase of seven medium aircraft. Negotiations between EIA and a leading U.S. bank are understood to be nearing a successful conclusion.

U. S. Equipment Order

REF ANV

Two British firms have retained a \$1.5-million order from the U.S. for mobile ground power units for starting jet aircraft. The stations are for the use of the Western Allies.

Sharing the order are Astra Diesel, Ltd., and Compton Petreken, Ltd.

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FINANCIAL

The Rise in Aircraft Shares

COMPANY	JUNE 30, 1962 (\$1,000)	JULY 31, 1964 (\$1,000)	PERCENTAGE INCREASE	PERCENT CHANGE
Beech	\$1.11	\$10.00	8,889	95.2
Boeing	\$1.00	\$10.00	9,000	90.0
Cessna	\$1.00	\$10.00	9,000	90.0
Convair	\$1.00	\$10.00	9,000	90.0
Douglas	\$1.00	\$10.00	9,000	90.0
Fokker-Wright	\$1.11	\$10.00	8,889	95.2
Hawker	\$1.00	\$10.00	9,000	90.0
Lockheed	\$1.00	\$10.00	9,000	90.0
Martin	\$1.00	\$10.00	9,000	90.0
McDonnell	\$1.00	\$10.00	9,000	90.0
North American	\$1.00	\$10.00	9,000	90.0
Rockwell	\$1.00	\$10.00	9,000	90.0
Ryan	\$1.00	\$10.00	9,000	90.0
United Aircraft	\$1.00	\$10.00	9,000	90.0

Note: - Adjusted for stock splits.
 * Before flotation, except oil companies.

EXCERPT FROM AIRLINE INDUSTRY

Aircraft Stock Prices Spurt Ahead

Industry's stable outlook is reflected in continued rise of shares; some have doubled since 1963 year-end.

Rising price quotations and sustained strength in aircraft equities have been a outstanding market phenomenon this for this past year. Aircraft stocks have more than doubled in price since the start of the year. Heavy engines, in varying degrees, are prominent for the current rise.

This accomplishment is disclosed in the Aviation Week compilation (above) of the market value of all major aircraft companies' common stocks as of the first seven and one-half months of this year.

Up Up Up-The basis of strength as overall equity prices has consolidated something of a steady contour line for the group for a long time. Causing price gains on top of the already rising market quotations for the aircraft group, in progress for a few years now, but the price boosts registered by a number of aircraft stocks thus far in 1964 have been more spectacular than the upward climbs experienced during past periods of two or more years.

The motivation that leads investors and speculators to buy or sell specific types of securities at a specific time has never been susceptible to a precise analysis. The aircraft high-technology products are the stock for the aircraft industry, but there is not well established an irresponsible investment nucleus for these stocks.

Good business has brought about the recent market rally. In the case of aircraft stocks, the market rally has been so strong that it has become a self-reinforcing cycle. For example, a few years ago, it was considered good judgment to some car-

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due to value aircraft savings of four or
five times their current rate. This meant
that a company that was expected to
show annual savings of about \$3,800
per short would find its cost cut striking
off at around \$15 per share.

Today, as tenders decline in value
aircraft savings of seven or eight times,
and even higher, the impact on market
equilibrium becomes irrelevant. Price/saving ratios are nearly constant, they
are influenced by general market pressure,
marketplace changes and evaluations
of individual industry groups competing
with one another.

The fact remains that most aircraft
today have given the market a happy time that it had in 1956, although
no one can say exactly what happened
at that point. The table on page 39 shows
a range of 17 to 36, or from 117.1% to
233.8% of price at the close of 1953.
► **Star Performer**—Douglas is clearly
the outstanding performer, having more
than doubled its price since early this
year (\$36.00 vs. \$51.30). The com-
pany's claims were quite two far above the
rest. May not the expectations of the
new stock price be about the level of the
old stock price in the split?

Bacau, which also effected a stock
split earlier this year, has little time
in store than doubling its prior (\$19.85
vs. \$34.00).

Beech, after it reached its peak
level and improved its methods, found
expansion sufficient to bid its common
stock to a new peak and almost double
the price recorded at the 1953 year-
end (\$19.15 vs. \$39.75).

► **Speculative Supply**—The speculative
elements behind aircraft stock prices
can be seen in the market by knowing
precisely the commitment that
North American Aviation received to
expand its development and build an
aerospace center for compressor jet

The company is widely entrenched
in the leadership of the backbone of the
Air Force's fighter program. Moreover,
its influence on strategic aircraft develop-
ment has been known for a long time.
For example, the company has been
involved in producing the first supersonic
airplane, the X-15, and is currently involved
in the development of the X-20 aerospace plane.

In other words, the buying impetus
comes from a belief which was present
for some time and which is unlikely to
contribute much, if anything, to earnings this year.

The selection of price gains among
the aircraft group since April reflects
the activities which have become so
preoccupied in the industry. These wide
fluctuations will continue to prevail in
the future.

—Sieg Albrecht

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With that surpassing performance built into so many around the world, the Boeing Post & Whitney Aircraft JT3 turbo-electric counterparts of the 16,000-lb thrust 1ST—leading hopes to prove that tomorrow's transportation has come to life.

► **Construction.**—The airplane layout shows nothing unusual in the way of aerodynamic geometry. The Boeing swept wing and tail, the cylindrical fuselage and polished passenger shell are acceptable current practice.

Structural design follows the same pattern. There are no thick wing skin sections, nor is the majority of the structure in the usual high-strength sheet metal alloy.

And one of the Boeing flight test



AS A COMMERCIAL TRANSPORT, the new Boeing 707 can seat up to 180 passengers and cruise at 37,000 feet at high altitude.

Exclusive Report on Boeing's Jet Transport

707 Designed for Low-Cost Operation

By David A. Anderson

Seattle.—The most unusual thing about Boeing Airplane Co.'s 707 jet transport prototype is that it is not unusual.

It is a conventional airplane by today's reckoning; pre-specified standards. It was designed that way deliberately by Boeing engineers, because they wanted to build an airplane that would have maximum efficiency and require minimum maintenance, whether go across the continental United States or a transpacific flight or the military in a theater.

With that surpassing performance built into so many around the world, the Boeing Post & Whitney Aircraft JT3 turbo-electric counterparts of the 16,000-lb thrust 1ST—leading hopes to prove that tomorrow's transportation has come to life.

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ENGINE MAINTENANCE is simplified by readily accessible, low-drag FAWA JT3 jet engines. The 707 and the Starliner, shown here, are comparable and share many similar design details.

Some engineers have been used to the leading edge of the wing, for example, that the majority of the structure is in the usual high-strength sheet metal alloy.

And one of the Boeing flight test

expansive canopies. "We're going to have to get used to seeing freight load being moved near again."

Also the only departure from conventional practice is in the lateral control system. A Boeing development, the system design really began on the B-47, was refined in the B-52, tested and further developed in the 707. It

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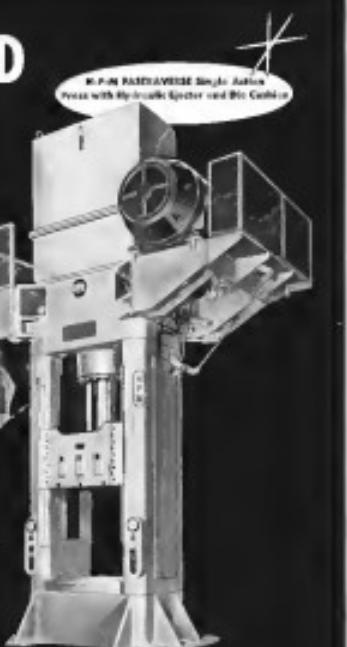


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Assisted by Attila Székely + Andor Lászlo
Borsig + Sipos + Balázs Mihály + Szabó + Szűcs
Katalin + Tóth + Oroszán + Dózsa + Székely
Károlyné Vörös + Görcse János + Nagy Árpád



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takeoff faster, but they wound the two by in a point-to-point transport lift.

Current search work for the 787 is about 120 mph, after a run of about 600 ft on the runway. Tests showed the fact that the plane is flying at 94%, that is, a respectable takeoff flying jet capability. Final approaches are at 90% and sites, with what appears to be a variety of landing gear and lateral control mechanisms in use. The areas which will be most held off to increase the lift and thus the wingspan.

"Cost data will be one of the most important by-products of the flight test," says Ralph Bell, Boeing's director of sales. "It's not easy to estimate costs for these big jets, and we should have some excellent evidence from that test."

One engineer points out that the 797 will be another engine not built for the 757 customers. "That's not its prime purpose, of course," he says, "but it will be a very useful article to get environmental engine data in operation and maintenance."

The big question remains: "Who is going to join the DOT?"

Right now no one has announced intentions along those lines. It's a move that safety personnel have been making repeated visits to Seattle because damage, both in the neck and on the toppling shelf.

that Boeing is making no effort to push commercial sales. There are all kinds of current studies being made on and delivered data to customers and prospects, but the real evidence Boeing is trying to get is the U.S. Air

The staff believe there is a positive and a military requirement for a ratio that is the opposite from what will. Once they get a firm commitment from the military, then they will be the ones to sit down and plan for several options to be advanced along the lines.

This fuel resistant in Seattle that
time is just far off.

Tigers Win Payload
Increase for DC-6A

Civil Aerostatic Bond has applied a \$200,000 package estimate for Tiger Sheek Airlines DC-6A Air freighter, a name company president Robert W. Prentiss predicts will increase operating revenues of the firm as much as 16 million a year.

► In addition to making freight carriage a more feasible operation, Other DC-6A options are expected to make possible

However, the present waiver applies to Tamm and will not extend to

The Board's decision to end the Safe Regulation has been taking for some time on a separate basis by us as stage operators. Their application for the waiver given the Board a chance to try out our own rules under control and in effect a shorter, less costly regulation.

With such pipeline averaging one nonstop flight daily, that means we can increase our system revenue more than \$15,000 a month per route with only a relatively small cut in operating expense and with very modification of the aircraft," Scott says.

Time Runs Out on McCarran Bill

tion of large, irregular curves in an equation one of the most popular problems that concerns the Board.

During the last half hour, McCloskey, a committee member during the day of the hearings, having at that time all the facts concerning the subject of the hearings, will get ready and analyze the congressional record.

McCains called his bill "the plain" from which Congress can enact certain legislation.

SAB member Joseph Adams told the matrix: "The problem of supplemental service which brings before us problems of the economic and financial

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JUNE 21 AVIATION WEEK

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LETTERS

Night Copters

I am with Captain Dick Salvatore's in offering a report on National Airlines' long-distance operations to the Jet Aviation Week, and would like to call by name some of the points involving CAA.

Capt. E. T. Case, Jr., is quoted as suggesting that "the regulation prohibiting night passenger operation for helicopter transport should be waived at the rate of the helicopters."

Actually night helicopter flights are not prohibited. However, we do require, in the interest of safety, that any airline underling my such night operation must state that it is not to exceed at a rate twice that of the rate of regular daytime flights along the route. The route instrument rating for daylight flights. For night flying, regular flights of some kind probably would be necessary along parts of the route to satisfy safe flying factors. National Airlines has been most receptive, in my view, to be appealed for night helicopter operation.

This is a widespread misunderstanding; no strict requirements for helicopter pilot ratings.

To obtain a helicopter rating on a private basis, one need only to fly 100 hours total as flown on enroute aircraft. A pilot can obtain his license by flying fuel sales around at the small way. Then he can supplement this with whatever money a night flight is necessary to get the space rating. Finally, the license fees provide him with the basic fixed cost, and the only song aircraft while carrying passengers.

Only for a field of scheduled passenger carrying helicopters operation will a fixed number of hours experience be necessary. An annual report to the transportation department has to be submitted in a form of safety as helicopter transportation equivalent to conventional airway transport.

Formerly, in Capt. Case's point out 100 hours of night wing flying was required of a pilot so licensed as scheduled helicopter flight. This was because the night rating had to be reduced to 100 hours for pilots holding an airline transport rating and having related experience.

A. S. Kline, Director,
Division of Aviation Rules,
Federal Aviation Administration,
Washington 25, D. C.

From an Airways Staff

It was a pleasure to read Capt. Robert's article "60-800" (in a DC-7) in the June 25 issue. The captain's punctuation of a sentence and grammatical traps in so few weighty words is a credit to all of us who write.

The mechanics of the problem were well defined and the consequences of erroneous designs at all instances were adequately brought to issue.

In my opinion as Chief of the Federal Aviation Flight Inspection Service, the inspection of the effectiveness of the air traffic control system must be given top priority. However, as the upper air flight check is available, our efforts look down and hopefully, can

properly be measured with little public reflection of its worth.

On behalf of the 75 pilots, co-pilots and flight technicians who comprise the federal aviation flight inspection staff, I would like to thank Capt. Robert and AVIATION WEEK for the generous recognition.

Albert S. Jordan, W-120, Chief
Flight Inspection Division
Civil Aeronautics Administration
Department of Commerce, Wash., D. C.

Madsen Lights

Could you and 50 engineers of ours trade on the Madsen lights which appeared in the June 15 AVIATION WEEK ("Tales from Aviation," page 16)?

Thank you for the excellent coverage. The article presented a lot of facts for the benefit of our customers. Your correspondence has been most gratifying. One of the most interesting developments has been with the Boeing Airplane Co. in regard to the Boeing 727. On receiving correspondence from Bob we are glad to opportunity to fit the aircraft with the lights at Seattle and Douglas it is the Boeing people.

Andrew Madsen
Director of Research
Wetmore & Associates
Oakland, Calif.

Voluntary Censorship

Thank you for your letter of June 15, and for the information it contained. I should your desire to withhold from public attention information you have obtained about new developments ineronomics projects falls in the category of a valid public service to the nation.

Robert L. Dennerle
Director
National Advisory Committee
on Aerodynamics
1715 F Street, Northwest
Washington 25, D. C.

For editorial use, June 14 announced that AVIATION WEEK voluntarily was withholding publication of a memo submitted by a colleague which appears likely to disclose military aircraft characteristics and performance—R.D.

Viscous Speculation

Why so much talk following the announcement of Capital's purchase of three Vickers Viscounts? Has not the industry labeled the Viscount type as unsuited to an American market? Is not the Vickers type a failure in the June 25 issue of AVIATION WEEK? How much longer would it have had had the Viscount side been represented?

And the big group, off of a smaller line, to a much larger one, is it not a reasonable assumption that the Viscount side has been eliminated? It would be interesting to know.

Concerning Capital, I expect it was necessary for them to go in to outside sources to acquire the desired equipment, but I am glad they had the courage to take the initial

step. Perhaps, hopefully, it will give some of us out of our complacency and give us a world perspective.

For me, as for the longwinded Thorogood legend, is to put the bird up and we cannot afford to be second best if we hope to survive. Let's work yet!

George W. Wiersbach
628 Greenwich Rd.
Englewood, N.J.

Praise

Could we and 50 engineers of ours trade on the Madsen lights which appeared in the June 15 AVIATION WEEK ("Tales from Aviation," page 16)?

Thank you for the excellent coverage. The article presented a lot of facts for the benefit of our customers. Your correspondence has been most gratifying. One of the most interesting developments has been with the Boeing Airplane Co. in regard to the Boeing 727. On receiving correspondence from Bob we are glad to opportunity to fit the aircraft with the lights at Seattle and Douglas it is the Boeing people.

Andrew Madsen
Director of Research
Wetmore & Associates
Oakland, Calif.

We appreciate Frank Shatto's article in the June 7 AVIATION WEEK. Hope we will accept these contributions for their novelty and avoid the drivel.

George G. Chamberlain, Vice President,
Public Relations
The Woods Airlines, Inc.
321 Madison Ave.
New York 17, N. Y.

I should like to make 1,200 square feet of the following the new headline, within 16 lines if possible, for the July 12 issue:

"Or those interested with the story we highly pleased with the accuracy and depth displayed..."

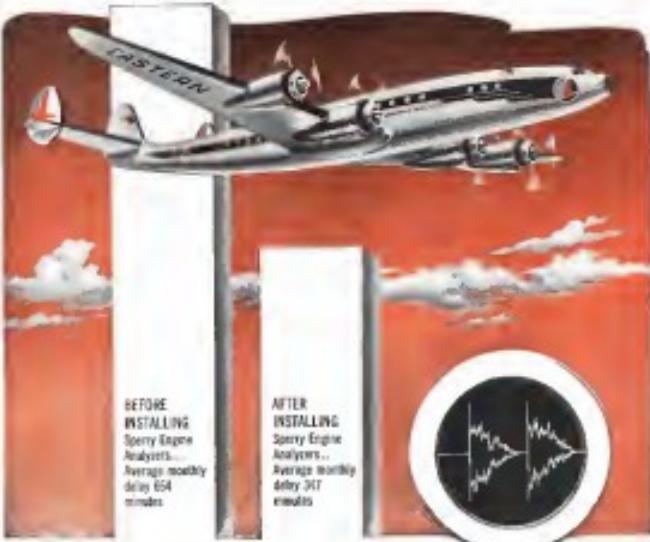
E. B. BRADLEY
E. TRACONIS BROTHERS
220 Park Ave.
New York 17, N. Y.

I have just read George Chamberlain's article in the June 7 AVIATION WEEK. New York City. He has done a remarkable job in presenting a lot of interesting information, which no doubt will be of great interest to all your readers. I have never seen a job handled better.

Peter F. Hayes, Assistant
Aeroquip Corp.
Jackson, Mich.

It was a pleasure to see the wonderful job that Bertie Long did on the story of the Midwest Airlines in the May 17 AVIATION WEEK. The graphic display was very well selected, and the story was a very accurate description of the midwest economy from it.

B. E. Sturz, Manager
Public & Ind. Rel.
Midwest Corp.
550 North Highland Ave.
Los Angeles 30, Calif.



Eastern Air Lines Reduces Ignition Delayed Time 47%

Results show Sperry Engine Analyzers save valuable minutes of non-compliance time.

Last fall Eastern Air Lines equipped five models of operation using Sperry Engine Analyzers with the same three models of the previous year before the Analyzers were installed.

These are the results per model:

■ Average delayed time dropped from 314 minutes to 167 minutes per month—a saving of 5 hours, 7 minutes, or 45%.

■ Average number of ignition delays each month dropped from 9 to 4—a reduction of 55%.

■ Average delayed time dropped from 314 minutes to 167 minutes per month—a saving of 5 hours, 7 minutes, or 45%.

■ Average number of ignition delays each month dropped from 9 to 4—a reduction of 55%.

Other savings, too:

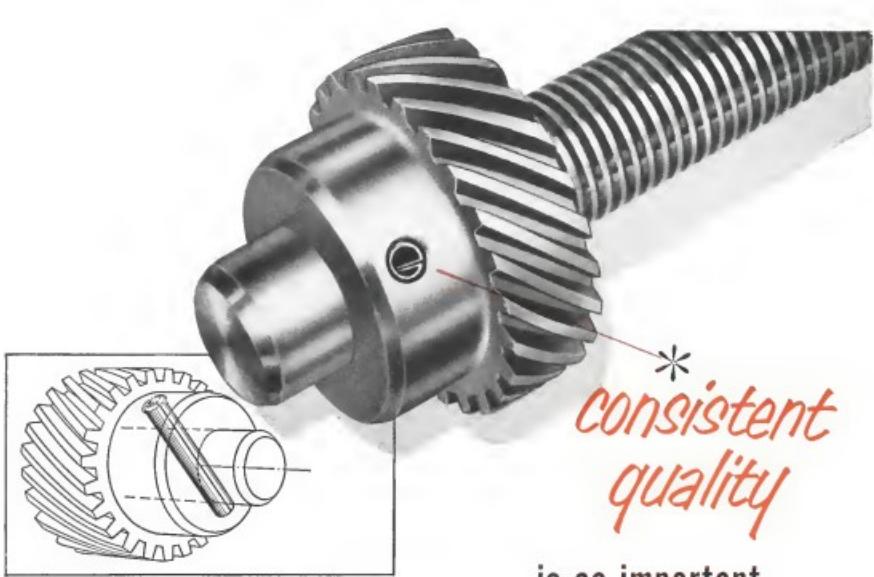
These savings alone only to ignition-distribution, distributor fingers, ground rods, ignition leads, magnatrons and spark plugs. When you consider the additional savings in fuel from more

efficient engine operation, it's easy to see why Eastern's status four-engine fleet is now being equipped with Sperry Engine Analyzers—not only why they've been specified for Eastern's new Douglas DC-3s.

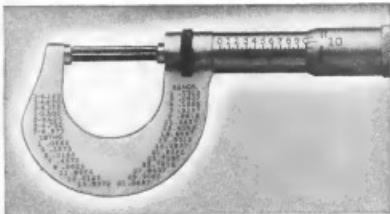
Sperry Engine Analyzers are the result of a unique combination of electronic circuitry and magnetic core technology which permits the simultaneous analysis of up to 16 ignition systems. They're designed to analyze both primary and secondary ignition systems, and to indicate the presence of misfiring cylinders.

For further information, contact the Sperry Engine Analyzer Division, Sperry Gyroscope Company, 100-1000 Rockwell International Drive, El Segundo, Calif. 90245, or the Sperry Gyroscope Division, 100-1000 Rockwell International Drive, El Segundo, Calif. 90245.

SPERRY GYROSCOPE COMPANY
A Division of Rockwell International Corporation



To function effectively, a spring pin must drive easily into holes drilled to normal production tolerances, compressing as driven. To drive easily, hold firmly and fit flush, the pin—*every pin*—must meet the strict requirements of specifications such as those prepared by the SAE and the Military Services.



Since failure of a pin can be as costly as a failure of any other precision part, it is important to check the pins you buy for uniformity...uniformity of diameter and length, shear strength, hardness, insertion and removal forces, and recovery of diameter.



ROLLPIN
TRADEMARK

*
*consistent
quality*

is as important
in the pin as in
the gear

Rollpin has been tested many times—by many manufacturers—with a consistently high performance record. It has been widely recognized as the "quality" fastener of its type. In this case, quality can be—and should be—measured. We strongly urge that you test for quality when buying spring pins.



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OF AMERICA**

Dept. R28-825, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, New Jersey

Please send the following free fastening information:

- Rollpin samples
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What self-locking fastener would
you suggest?

Name _____ Title _____

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Street _____

City _____ Zone _____ State _____